

Manual Clutch and Automatic

T135SE T135S

T135 SERVICE MANUAL

Sniper / Jupiter MX / Spark 135 / Exciter / 135LC

5YP-F8197-E0

EAS00000

**T135SE/T135S
SERVICE MANUAL
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NOTICE

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

Yamaha Motor Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

NOTE:

Designs and specifications are subject to change without notice.

IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following.

- | | |
|----------|---|
| Q | The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! |
| W | Failure to follow WARNING instructions could result in severe injury or death to the vehicle operator, a bystander or a person checking or repairing the vehicle. |
| C | CAUTION indicates special precautions that must be taken to avoid damage to the vehicle. |

NOTE:

NOTE provides key information to make procedures easier or clearer.

HOW TO USE THIS MANUAL

CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See "Illustrated symbols")

1st title 1 : This is a chapter with its symbol on the upper right of each page.

2nd title 2 : This title appears on the upper of each page on the left of the chapter symbol. (For the chapter "Periodic inspection and adjustment" the 3rd title appears.)

3rd title 3 : This is a final title.

MANUALFORMAT

All of the procedures in this manual are organized in a sequential, step - by - step format. The information has been compiled to provide the mechanic with a easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections.

A set of particularly important procedure 4 is placed between a line of mark "★" or "☆" with each procedure preceded by "8".

IMPORTANT FEATURES

8 Data and a special tool are framed in a box preceded by a relevant symbol 5 .

8 An encircled numeral 6 indicates a part name, and an encircled alphabetical letter date or an alignment mark 7 , the others being indicated by an alphabetical letter in a box 8 .

8 A condition of a faulty component will precede an arrow symbol and the course of action required the symbol 9 .

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.



12	<div>GEN</div> <div>INFO</div>	<div>SPEC</div>
34	<div>CHK</div> <div>ADJ</div>	<div>ENG</div>
5	<div>COOL</div>	<div>CARB</div>
7	<div>CHAS</div>	<div>ELEC</div> <div>-</div>
9	<div>TRBL</div> <div>SHTG</div>	<div></div>
q	<div></div>	<div>w</div> <div></div>
e	<div></div>	<div>r</div> <div></div>
t	<div></div>	<div>yu</div> <div></div> <div></div>
iop		
asd		
fg	<div>LT</div>	<div>New</div>

SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols 1 to 9 indicate the subject of each chapter.

- 1 General information
- 2 Specifications
- 3 Periodic checks and adjustments
- 4 Engine
- 5 Cooling system
- 6 Carburetor
- 7 Chassis
- 8 Electrical system
- 9 Troubleshooting

Symbols 0 to u indicate the following.

- 0 Serviceable with engine mounted
- q Filling fluid
- w Lubricant
- e Special tool
- r Tightening torque
- t Wear limit, clearance
- y Engine speed
- u Electrical data

Symbols i to d in the exploded diagrams indicate the types of lubricants and lubrication points.

- i Engine oil
- o Gear oil
- p Molybdenum-disulfide oil
- a Wheel-bearing grease
- s Lithium-soap-based grease
- d Molybdenum-disulfide grease

Symbols f to g in the exploded diagrams indicate the following.

- f Apply locking agent (LOCTITE®)
- g Replace the part



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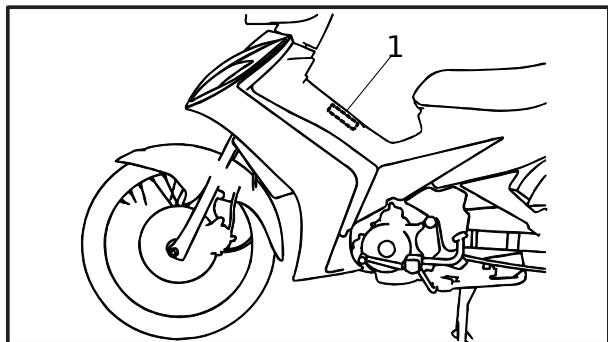
GENERAL INFORMATION	GEN INFO	1
SPECIFICATIONS	SPEC	2
PERIODIC CHECKS AND ADJUSTMENTS	CHK ADJ	3
ENGINE	ENG	4
COOLING SYSTEM	COOL	5
CARBURETOR	CARB	6
CHASSIS	CHAS	7
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TROUBLESHOOTING	TRBL SHTG	9



CHAPTER 1 GENERAL INFORMATION

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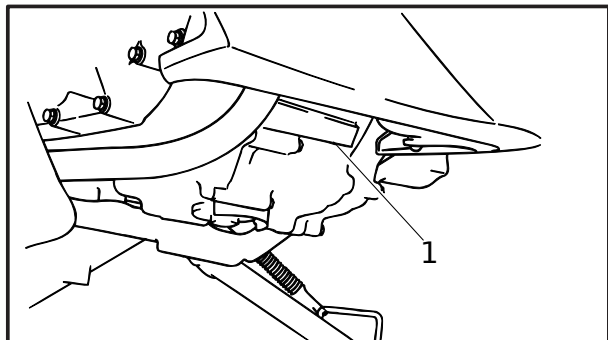
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**GENERAL INFORMATION
VEHICLE IDENTIFICATION**

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VEHICLE IDENTIFICATION NUMBER

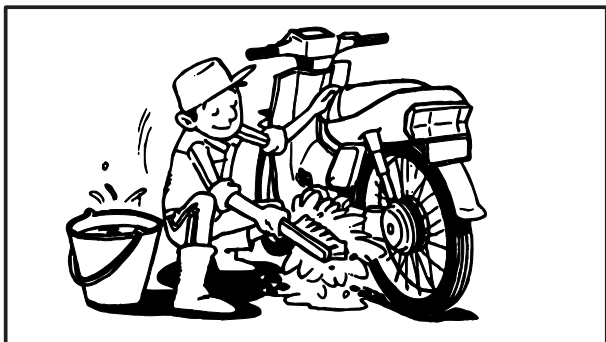
The number 1 is stamped into the center of the frame.

**ENGINE SERIAL NUMBER**

The engine serial number 1 is stamped into the crankcase.

NOTE:

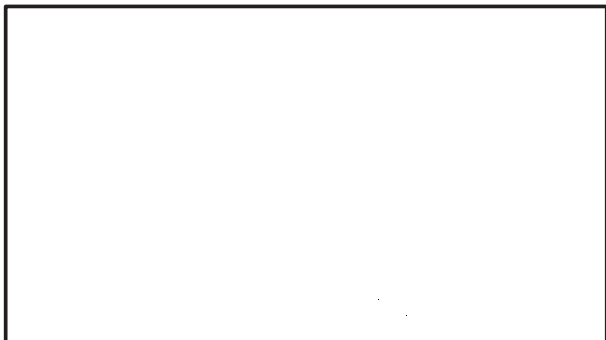
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IMPORTANT INFORMATION PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.
2. Use only the proper tools and cleaning equipment.
Refer to the "SPECIALTOOLS".
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.
4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.



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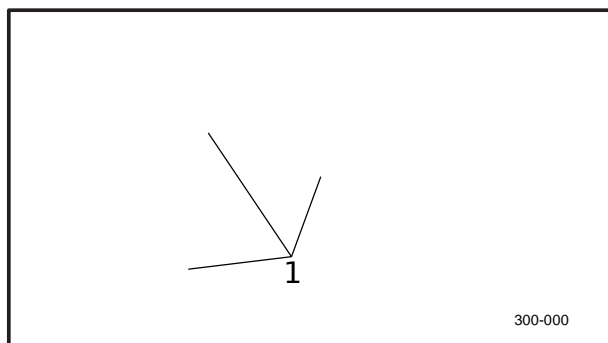
REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

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GASKETS, OILSEALS AND O-RINGS

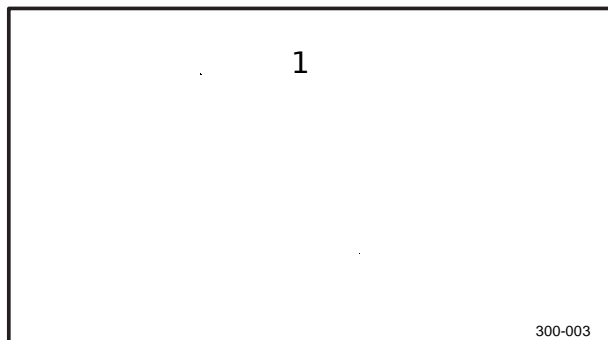
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



EAS00023

LOCK WASHERS/PLATES AND COTTER PINS

After removal, replace all lock washers/plates **1** and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.



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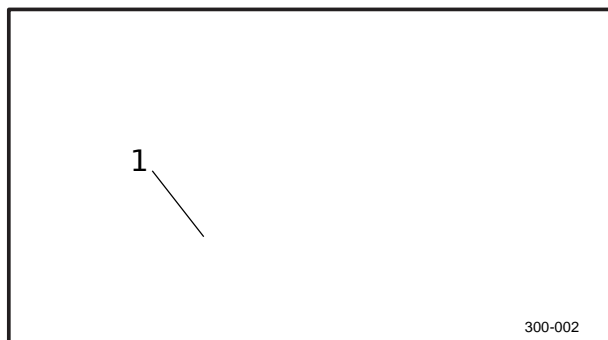
BEARINGS AND OILSEALS

Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

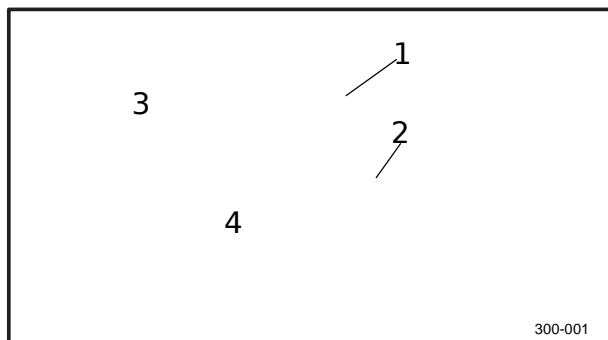
- 1 Oil seal

CC

Do not spin the bearing with compressed air because this will damage the bearing surfaces.



- 1 Bearing



EAS00025

CIRCLIPS

Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip **1**, make sure the sharp-edged corner **2** is positioned opposite the thrust **3** that the circlip receives.

- 4 Shaft

EAS00026

CHECKING THE CONNECTIONS

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:

- 9lead
- 9coupler
- 9connector

2. Check:

- 9lead
- 9coupler
- 9connector

Moisture → Dry with compressed air.

Rust/stains → Connect and disconnect several times.

3. Check:

- 9all connections
- Loose connection → Connect properly.

NOTE: _____

If the pin 1 on the terminal is flattened, bend it up.

4. Connect:

- 9lead
- 9coupler
- 9connector

NOTE: _____

Make sure all connections are tight.

5. Check:

- 9continuity
- (with the pocket tester)

	Pocket tester 90890-03112
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NOTE: _____

8If there is no continuity, clean the terminals.

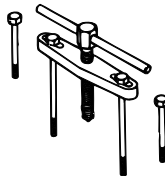
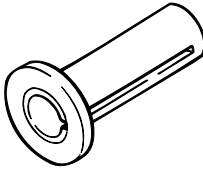

8When checking the wire harness, perform steps (1) to (3).

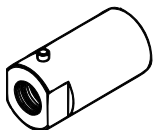
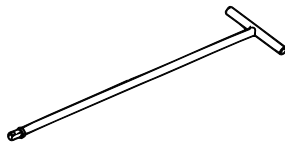
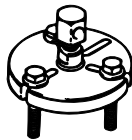
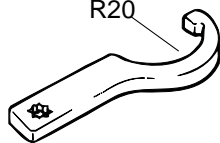
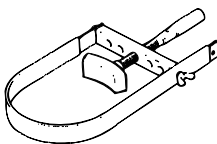
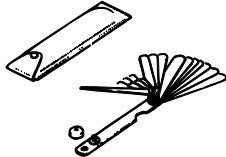
8As a quick remedy, use a contact revitalizer available at most part stores.

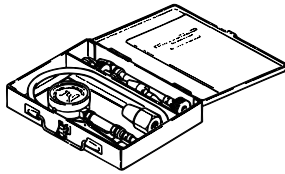
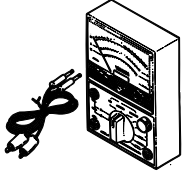
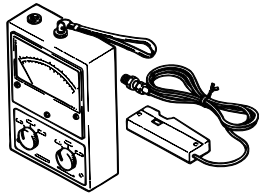
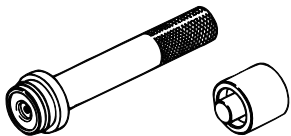
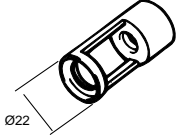
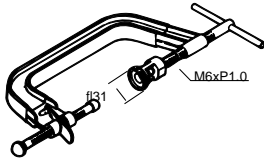

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SPECIALTOOLS

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. When placing an order, refer to the list provided below to avoid any mistakes.

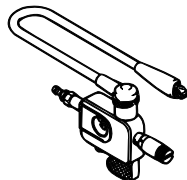
Tool No.	Tool name/Usage	Illustration
90890-01052	Meter gear bush tool This tool is used to remove or install the bushing.	
90890-01135	Crankcase separating tool This tool is necessary for separating the crankcase.	
90890-01184	Fork seal driver weight This tool is used for to install the oil seal.	
90890-01186	Fork seal driver attachment This tool is used to install the oil seal.	
90890-01268	Ring nut wrench This tool is used to loosen and tighten the steering ring nut	
90890-01274	Crankshaft instoller pot This tool is necessary for installing the crankshaft.	
90890-01275	Crankcase installer bolt This tool is necessary for installing the crankshaft.	

Tool No.	Tool name/Usage	Illustration
90890-01278	Adaptor (M12) This tool is necessary for installing the crankshaft.	
90890-01311	Tappet adjusting tool This tool is necessary for adjusting valve clearance.	
Radiator cap tester 90890-01325 Radiator cap tester adapter 90890-01352	Radiator cap tester Radiator cap tester adapter These tools are used to check the cooling system.	
90890-01326	T-handle This tool is used for holding the damper rod holder when removing or installing the damper rod holder.	
90890-01362	Flywheel puller This tool is used for removing the roter.	
90890-01403	Steering nut wrencht This tool is used to loosen and tighten the steering ring nut	
90890-01701	Sheave holder This tool is used for holding the generator roter.	
90890-03079	Thickness gauge This tool is used to measure the valve clearance.	

Tool No.	Tool name/Usage	Illustration
90890-03081	Compression gauge These tools are used to measure the engine compression.	
90890-03112	Pocket tester This instrument is necessary for checking the electrical system.	
90890-03113	Engine tachometer This tool is needed for detecting engine rpm.	
Middle driven shaft bearing driver 90890-04058 Mechanical seal installer 90890-04145	Middle driven shaft bearing driver Mechanical seal installer These tools are used to install the water pump seal.	
90890-04108	Valve spring compressor Attachment This tool is used when removing or installing the valve and valve spring.	
90890-04019	Valve spring compressor This tool is used when removing or installing the valve and valve spring.	
90890-04081	Spacer This tool is necessary for insatlling the crankshaft.	
90890-04086	Universal clutch holder This tool is needed to hold the clutch when removing or installing the clutch boss nut.	

SPECIALTOOLS

GEN
INFO

Tool No.	Tool name/Usage	Illustration
90890-04101	<p>Valve lapper</p> <p>This tool is used for removeing and installing the lifter and for lapping the valve.</p>	
90890-04116	<p>Valve guide remover (4.5 mm)</p> <p>This tool is needed to remove and installing the valve guide.</p>	
90890-04117	<p>Valve guide installer (4.5 mm)</p> <p>This tool is needed to install the valve guide.</p>	
90890-04118	<p>Valve guide reamer (4.5 mm)</p> <p>This tool is needed rebore the new valve guide.</p>	
90890-06754	<p>Ignition checker</p> <p>This instrument is necessary for check- ing the ignition system components.</p>	

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	T135SE/T135S
Model code	5YP1 (T135SE) 5YP2 (T135S)
Dimensions Overall length Overall width Overall height Seat height Wheelbase Minimum ground clearance Minimum turning radius	1,945 mm (76.6 in) 705 mm (27.8 in) 1,065 mm (41.9 in) 770 mm (30.3 in) 1,245 mm (49.0 in) 140 mm (5.51 in) 1,900 mm (74.8 in)
Weight Wet (with oil and full fuel tank)	109 kg (240 lb)
Engine Engine type Cylinder arrangement Displacement Bore · stroke Compression ratio Compression pressure (STD) Starting system Lubrication system Engine idling speed	Liquid-cooled 4-stroke, SOHC Forward-inclined single cylinder 134.4 cm ³ (8.20 cu.in) 54.0 · 58.7 mm (2.13 · 2.31 in) 10.9 : 1 560 kPa (80 psi) (5.6 kgf/cm ²) at 500 r/m/ with electric starter Kick and electric starter Wet sump 1,300 – 1,500 r/min
Oil type or grade Engine oil Periodic oil change amount Total amount	SAE 20W40 type SF or higher grade motor oil 0.8 L(0.70 Imp.qt, 0.85 US qt) 1.15 L(1.01 Imp.qt, 1.22 US qt)
Oil filter	Paper
Oil pump	Gear pump
Cooling system Coolant Coolant reservoir capacity (up to the maximum level mark) Radiator capacity (include all routes)	YAMAHA GENUINE COOLANT 0.28L(0.25 Imp.qt, 0.30 US qt) 0.62L(0.55 Imp.qt, 0.66 US qt)
Air filter	Dry type paper element
Fuel Recommended fuel Fuel tank capacity	Regular gasoline 4.0 L(0.88 Imp.gal, 1.06 US gal)

GENERAL SPECIFICATIONS

SPEC

Model		T135SE/T135S	
Carburetor			
Type/quantity		VM22/1	
Manufacturer		MIKUNI	
Spark plug			
Type		CPR8EA-9	
Manufacturer		NGK	
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)	
Clutch type		Wet, multiple-disc and centrifugal automatic	
Transmission			
Primary reduction system		Spur gear	
Primary reduction ratio		69/24 (2.875)	
Secondary reduction system		Chain drive	
Secondary reduction ratio		39/15 (2.600)	
Transmission type		Constant mesh 4 speed	
Operation		Left foot operation	
Gear ratio	1st	34/12 (2.833)	
	2nd	30/16 (1.875)	
	3rd	23/17 (1.353)	
	4th	23/22 (1.045)	
Chassis			
Frame type		Diamond	
Caster angle		25.3°	
Trail		73.0 mm (2.87 in)	
Tire			
Type		With tube	
Size front		60/100-17M/C 33P	
	rear	80/90-17M/C 44P	
Model (manufacturer)	front	IRC/NF63B, Vee Rubber/V304	
	rear	IRC/NR78Y, Vee Rubber/V304	
Min. tire tread depth	front	0.8 mm (0.03 in)	
	rear	0.8 mm (0.03 in)	
Tire pressure (cold tire)			
Maximum load*-except vehicle		110 kg (243 lb)	
	front	200 kPa (29 psi) (2.00 kgf/cm²)	
	rear	225 kPa (33 psi) (2.25 kgf/cm²)	

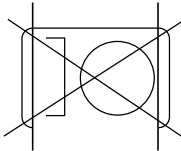
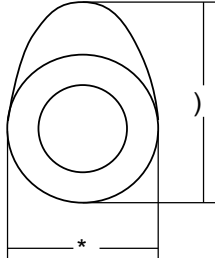
* Load is the total weight of cargo, rider, passenger, and accessories.

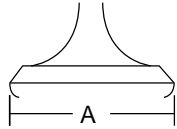
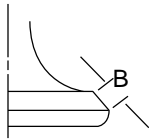
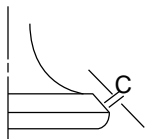
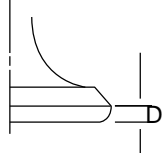
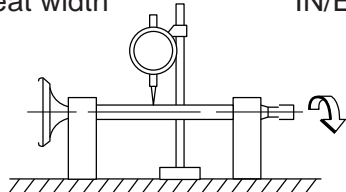
GENERAL SPECIFICATIONS

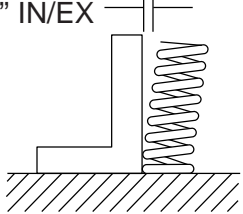
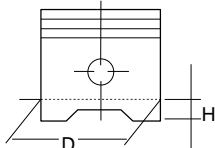
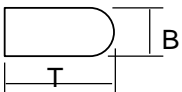
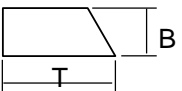
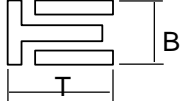
SPEC

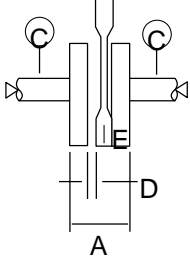
Model	T135SE/T135S
Brake Front brake type operation Rear brake type operation	Single disc brake Right hand operation Drum brake Right foot operation
Suspension Front suspension Rear suspension	Telescopic fork Swingarm (monocross)
Shock absorber Front shock absorber Rear shock absorber	Coil spring/oil damper Coil spring/oil damper
Wheel travel Front wheel travel Rear wheel travel	100 mm (3.94 in) 90 mm (3.54 in)
Electrical Ignition system Generator system Battery type/manufacturer Battery capacity	DC. C.D.I. A.C. magneto GM5Z-3B/LOCALMADE 12 V 5 AH
Headlight type	Krypton bulb
Bulbs (voltage/wattage · quantity) Headlight Auxiliary light Tail/brake light Front turn signal light Rear turn signal light Meter light High beam indicator light Neutral indicator light Turn signal indicator light Coolant temperature warning light Gear position indicator light	12 V 32 W/32 W · 1 12 V 5 W · 2 12 V 5 W/21 W · 1 12 V 10 W · 2 12 V 10 W · 2 12 V 1.7 W · 1 12 V 1.7 W · 1 12 V 1.7 W · 1 12 V 1.7 W · 1 12 V 1.7 W · 1 12 V 1.7 W · 4

MAINTENANCE SPECIFICATIONS
ENGINE

Item	Standard	Limit
Cylinder head Max. warpage "*" 	----	0.03 mm (0.0012 in)
Cylinder Bore Out of round limit	54.000 – 54.010 mm (2.1260 – 2.1264 in) ----	54.1 mm (2.1299 in) 0.05 mm (0.002 in)
Camshaft Drive Method Cam dimensions Intake "A" "B" Exhaust "A" "B" Camshaft runout limit	 Chain drive (left) 29.643 – 29.743 mm (1.1670 – 1.1710 in) 25.073 – 25.173 mm (0.9871 – 0.9911 in) 29.942 – 30.042 mm (1.1788 – 1.1828 in) 25.019 – 25.119 mm (0.9850 – 0.9889 in)	29.613 mm (1.1659 in) 25.043 mm (0.9859 in) 29.912 mm (1.1776 in) 24.989 mm (0.9838 in) 0.03 mm (0.0012 in)
Timing chain Timing chain type/No. of links Tensioning system	SILENTCHAIN/96 Automatic	---- ----
Rocker arm/rocker arm shaft Rocker arm inside diameter Rocker arm shaft outside diameter Rocker-arm-to-rocker-arm-shaft clearance	9.985 – 10.000 mm (0.3931 – 0.3937 in) 9.966 – 9.976 mm (0.3924 – 0.3928 in) 0.009 – 0.034 mm (0.0004 – 0.0130 in)	10.030 mm (0.0012 in) 9.950 mm (0.3917 in) 0.08 mm (0.0031 in)

Item		Standard	Limit
Valve, valve seat, valve guide			
Valve clearance (cold)	IN	0.10 – 0.14 mm (0.0039 – 0.0055 in)	----
	EX	0.16 – 0.20 mm (0.0063 – 0.0079 in)	----
Valve dimensions			
   			
Head Diameter		Face Width	Seat Width
Margin Thickness			
"A" head diameter	IN	19.40 – 19.60 mm (0.7638 – 0.7717 in)	----
	EX	16.90 – 17.10 mm (0.6654 – 0.6732 in)	----
"B" face width	IN	1.583 – 2.138 mm (0.060 – 0.0842 in)	----
	EX	1.538 – 2.138 mm (0.0606 – 0.0842 in)	----
"C" seat width	IN	0.9 – 1.1 mm (0.035 – 0.043 in)	1.6 mm (0.0630 in)
	EX	0.9 – 1.1 mm (0.035 – 0.043 in)	1.6 mm (0.0630 in)
"D" margin thickness	IN	0.5 – 0.9 mm (0.20 – 0.36 in)	----
	EX	0.5 – 0.9 mm (0.20 – 0.36 in)	----
Valve stem outside diameter	IN	4.475 – 4.490 mm (0.1762 – 0.1768 in)	4.450 mm (0.1752 in)
	EX	4.460 – 4.475 mm (0.1756 – 0.1762 in)	4.435 mm (0.1746 in)
Guide inside diameter	IN	3.950 – 4.050 mm (0.1555 – 0.1594 in)	4.542 mm (0.1788 in)
	EX	3.950 – 4.050 mm (0.1555 – 0.1594 in)	4.542 mm (0.1788 in)
Valve-stem-to-guide clearance	IN	0.0010 – 0.037mm (0 – 0.0015 in)	0.080 mm (0.0032 in)
	EX	0.025 – 0.052 mm (0.0010 – 0.0020 in)	0.100 mm (0.0039 in)
Valve stem runout limit		----	0.01 mm (0.0004 in)
Valve seat width	IN/EX	0.9 – 1.1 mm (0.035 – 0.043 in)	1.6 mm (0.0630 in)
			

Item	Standard	Limit
Valve spring		
Free length IN/EX	47.33 mm (1.86 in)	44.96 mm (1.77 in)
Installed length (valve closed) IN/EX	35.30 mm (1.39 in)	----
Compressed spring force IN/EX	135.6 – 156.0 N (13.8 – 15.8 kgf) at 35.3 mm (1.39 in)	----
Tilt limit “*” IN/EX	----	2.0 mm (0.08 in)
		
Winding direction IN/EX	Clockwise	----
Piston		
Piston-to-cylinder clearance	0.015 – 0.048 mm (0.0006 – 0.0019 in)	0.150 mm (0.0059 in)
Piston size “D”	53.962 – 53.985 mm (2.1245 – 2.1254 in)	----
Measuring point “H”	5.0 mm (0.1969 in)	----
Offset	0.25 mm (0.0098 in)	----
Offset direction	Intake side	----
Piston pin bore inside diameter	14.002 – 14.013 mm (0.5513– 0.5517 in)	14.043 mm (0.5529 in)
Piston pin outside diameter	13.995 – 14.000 mm (0.5510– 0.5512 in)	13.975 mm (0.5502 in)
		
Piston rings		
Top ring		
Ring type	Barrel	----
Dimensions (B · T)	0.80 · 1.90 mm (0.03 · 0.07 in)	----
End gap (installed)	0.10 – 0.25 mm (0.0098 in) (0.00-0.01 in)	0.40 mm (0.0157 in)
Ring side clearance (installed)	0.030 – 0.065 mm (0.0012-0.0026 in)	0.10 mm (0.0039 in)
2nd ring		
Ring type	Taper	----
Dimensions (B · T)	0.80 · 2.15 mm (0.03 · 0.08 in)	----
End gap (installed)	0.10 – 0.25 mm (0.0098 in) (0.00-0.01 in)	0.40 mm (0.0157 in)
Ring side clearance	0.020 – 0.055 mm (0.0008-0.0022 in)	0.10 mm (0.0039 in)
Oil ring		
Dimensions (B · T)	1.50 · 1.95 mm (0.06 · 0.08 in)	----
End gap (installed of oil ring rails)	0.20 – 0.70 mm (0.01 – 0.03 in)	----
		
		
		

Item	Standard	Limit
Crankshaft  <p>Crank width "A"</p> <p>Max. runout limit "C"</p> <p>Big end side clearance "D"</p> <p>Big end radial clearance "E"</p>	<p>45.95 – 46.00 mm (1.81-1.81 in)</p> <p>----</p> <p>0.11 – 0.41 mm (0.0403 – 0.016 in)</p> <p>0.004 – 0.014 mm (0.10 – 0.11 in)</p>	<p>----</p> <p>0.03 mm (0.0012 in)</p> <p>----</p> <p>----</p>
Clutch <p>Friction plate #1</p> <p>Thickness</p> <p>Plate quantity</p> <p>Friction plate #2</p> <p>Thickness</p> <p>Plate quantity</p> <p>Clutch plates</p> <p>Thickness</p> <p>Plate quantity</p> <p>Max. warpage</p> <p>Clutch springs</p> <p>Free length</p> <p>Spring quantity</p> <p>Clutch release method</p> <p>Clutch shoe thickness</p> <p>Clutch shoe groove depth</p> <p>Clutch housing inside diameter</p> <p>Weight outside diameter</p> <p>Clutch - in revolution</p> <p>Clutch - stall revolution</p> <p>Push rod bending limit</p>	<p>2.5 – 2.7 mm (0.10 – 0.11 in)</p> <p>3</p> <p>2.5 – 2.7 mm (0.10 – 0.11 in)</p> <p>1</p> <p>1.59 – 1.68 mm (0.06-0.07 in)</p> <p>3</p> <p>----</p> <p>40.5 mm (1.60 in)</p> <p>4</p> <p>Inner push, cam push</p> <p>2.0 mm (0.08 in)</p> <p>1.0 mm (0.04 in)</p> <p>116 mm (4.57 in)</p> <p>116 mm (4.57 in)</p> <p>1,750 – 2,150 r/min</p> <p>2,930 – 3,430 r/min</p> <p>----</p>	<p>2.4 mm (0.09 in)</p> <p>----</p> <p>2.4 mm (0.09 in)</p> <p>----</p> <p>----</p> <p>0.05 mm (0.0020 in)</p> <p>38.5 mm (1.52 in)</p> <p>----</p> <p>----</p> <p>----</p> <p>0.1 mm (0.0039 in)</p> <p>117 mm (4.6063 in)</p> <p>115 mm (4.5276 in)</p> <p>----</p> <p>----</p> <p>0.5 mm (0.02 in)</p>
Transmission <p>Main axle runout limit</p> <p>Drive axle runout limit</p>	<p>----</p> <p>----</p>	<p>0.03 mm (0.0012 in)</p> <p>0.03 mm (0.0012 in)</p>

MAINTENANCE SPECIFICATIONS

SPEC

Item	Standard	Limit
Kickstarter		
Kickstarter type	Ratchet type	----
Spring free length	15.5 mm (0.61 in)	----
Carburetor		
Type	VM22	----
I.D. mark	5YP1 00	----
Main jet (M.J)	#105	----
Main air jet (M.A.J)	ø1.2	----
Jet needle (J.N)	5 K010	----
Needle jet (N.J)	N-9M	----
Pilot outlet (P.O)	ø1	----
Pilot jet (P.J)	#20	----
Pilot air screw turns out	1-5/8	----
Pilot air jet 1	#55	----
Valve seat size	ø2	----
Throttle valve size	#2.0	----
Float height	9.2 mm (0.3622 in)	----
Oil pump		
Oil pump type	Trochoid type	----
Inner-rotor-to-outer-rotor-tip clearance	0.15 mm (0.0059 in)	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump housing clearance	0.06 – 0.11 mm (0.0024 – 0.0043 in)	0.15 mm (0.0059 in)
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance	0.06 – 0.11 mm (0.0024 – 0.0043 in)	0.15 mm (0.0059 in)

Model	T135SE/T135S
Lubrication chart	

TIGHTENING TORQUES

ENGINE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nmm	kgf	lb	
Cylinder head	Bolt	M8	4	22	2.2	16	
Cylinder head (timing chain side)	Bolt	M6	2	10	1.0	7.2	
Cylinder head (oil check)	Screw	M6	1	7	0.7	5.0	
Spark plug	—	M10	1	13	1.3	9.5	
Cylinder head cover	Bolt	M6	5	10	1.0	7.2	
Reed valve assembly	Bolt	M6	2	10	1.0	7.2	
Water pump assembly	Bolt	M6	3	10	1.0	7.2	
Stud bolt (cylinder head)	Bolt	M8	2	15	1.5	11	
Cylinder (coolant water drain)	Bolt	M6	1	7	0.7	5.0	
Generator rotor	Nut	M12	1	70	7.0	50	
Timing chain guide (intake side)	Screw	M6	1	10	1.0	7.2	
Valve adjusting screw locknut (intake and exhaust side)	Nut	M5	4	7	0.7	5.0	
Camshaft sprocket	Bolt	M8	1	30	3.0	22	
Camshaft retainer	Bolt	M6	2	7	0.7	5.0	LT
Timing chain tensioner assembly	Bolt	M6	2	10	1.0	7.2	
Thermostat cover	Bolt	M6	2	10	1.0	7.2	LT
Oil pump assembly	Bolt	M5	2	7	0.7	5.0	
Element cover	Bolt	M6	3	10	1.0	7.2	
Engine oil drain bolt	Bolt	M35	1	32	3.2	23	
Oil pump cover plate	Bolt	M6	2	10	1.0	7.2	
Intake manifold (engine side)	Bolt	M6	2	10	1.0	7.2	
Carburetor assembly	Bolt	M6	2	10	1.0	7.2	
Resonator	Bolt	M6	1	10	1.0	7.2	
Exhaust pipe	Nut	M8	2	15	1.5	11	
Muffler and muffler bracket	Bolt	M8	1	17	1.7	13	
Muffler and passenger footrest	Bolt	M10	1	38	3.8	28	
Air filter assembly	Bolt	M6	2	10	1.0	7.2	
Crankcase	Bolt	M6	14	10	1.0	7.2	
Crankcase cover (left)	Bolt	M6	8	10	1.0	7.2	
Drive sprocket cover	Bolt	M6	2	7	0.7	5.0	
Crankcase cover (right)	Bolt	M6	10	10	1.0	7.2	
Center plug	—	M32	1	7	0.7	5.0	
Timing check plug	—	M14	1	3	0.3	2.2	
Kick crank assembly	Bolt	M10	1	50	5.0	36	
Ratchet wheel guide	Bolt	M6	2	12	1.2	9.0	LT
Starter clutch	Bolt	M6	3	14	1.4	10.1	stake
Clutch shoe housing	Nut	M12	1	50	5.0	36	
Clutch pressure plate	Bolt	M6	4	12	1.2	9.0	
Clutch boss	Nut	M14	1	70	7.0	50.4	

MAINTENANCE SPECIFICATIONS

SPEC

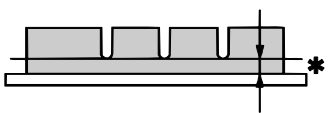
Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nmm	kgft	lb	
Drive sprocket	Bolt	M6	1	10	1.0	7.2	LT
Main axle bearing retainer	Screw	M6	2	7	0.7	5.0	
Clutch release adjusting locknut	Nut	M6	1	8	0.8	6.0	
Shift pedal	Bolt	M8	1	18	1.8	13	LT
Shift drum segment	Bolt	M6	1	12	1.2	9.0	
Shift drum stopper lever	Bolt	M6	1	10	1.0	7.2	
Shift lever stopper screw	Screw	M8	1	10	1.0	7.2	LT
Pickup coil	Bolt	M6	2	10	1.0	7.2	LT
Stator coil	Bolt	M6	3	10	1.0	7.2	LT
Neutral switch	Screw	M5	2	4	0.4	2.9	LT
Starter motor	Bolt	M6	2	10	1.0	7.2	

CHASSIS

Item	Standard	Limit
Steering system		
Steering bearing type	Ball and race bearing	----
Lock-to-lock angle (left/right)	45°	----
Front suspension		
Front fork travel	100 mm (3.94 in)	----
Fork spring free length	295.3 mm (11.63 in)	289.4 mm (11.39 in)
Installed length	288.3 mm (11.35 in)	----
Spring rate	(K1) 3.60 N/mm (0.37 kgf/mm, 20.56 lb/in)	----
	(K2) 8.50 N/mm (0.87 kgf/mm, 48.54 lb/in)	----
Stroke (K1)	0 – 65.0 mm (0.00 – 2.56 in)	----
	(K2) 65 – 100 mm (2.56 – 3.94 in)	----
Optional spring available	No	----
Oil capacity	0.064 L(64 cm ³)	----
Oil level	104.5 mm (4.11 in)	----
Recommended oil	Fork oil 10W or equivalent	----
Inner tube outer diameter	26 mm (1.02 in)	----
Inner tube bend limit	----	0.2 mm (0.0079 in)
Rear suspension		
Shock absorber stroke	27.5 mm (1.0827 in)	----
Spring free length	115.4 mm (4.54 in)	113.1 mm (4.4528 in)
Installed length	106.4 mm (4.19 in)	----
Spring rate	(K1) 220 N/mm (22.43 kgf/mm, 1256.2 lb/in)	----
	(K2) 316 N/mm (32.22 kgf/mm, 1804.36 lb/in)	----
Stroke (K1)	0.0 – 8.0 mm (0.00 – 0.31 in)	----
	(K2) 8.0 – 27.5 mm (0.31 – 1.08 in)	----
Optional spring available	No	----
Front wheel		
Type	Spoke wheel	----
Rim size	17 · 1.20	----
Rim material	Steel	----
Max. radial wheel runout	----	1.0 mm (0.04 in)
Max. lateral wheel runout	----	0.5 mm (0.02 in)

MAINTENANCE SPECIFICATIONS

SPEC

Item	Standard	Limit
Rear wheel		
Type	Spoke wheel	----
Rim size	17 · 1.60	----
Rim material	Steel	----
Max. radial wheel runout	----	1.0 mm (0.04 in)
Max. lateral wheel runout	----	0.5 mm (0.02 in)
Drive chain		
Type/manufacturer	428/DAIDO	----
Link quantity	112	----
Drive chain slack	25 – 35 mm (0.98 – 1.38 in)	----
Front brake		
Disc brake type	Single	----
Disc outside diameter · thickness	220.0 · 3.5 mm (8.66 · 0.14 in)	3.0 mm (0.12 in)
Pad thickness inner	5.3 mm (0.21 in)	0.8 mm (0.03 in)
Pad thickness outer	5.3 mm (0.21 in)	0.8 mm (0.03 in)
		
Master cylinder inside diameter	11 mm (0.43 in)	----
Caliper cylinder inside diameter	33.3 mm (1.31 in)	----
Brake fluid type	DOT3 or 4	----
Rear brake		
Drum brake type	Leading, trailing	----
Rear brake pedal free play (pedal end)	25 – 35 mm (0.98 – 1.38 in)	----
Drum inside diameter	130 mm (5.12 in)	131.0 mm (5.16 in)
Lining thickness	4 mm (0.16 in)	2 mm (0.08 in)
Shoe spring free length 1	52 mm (2.05 in)	61.2 mm (2.41 in)
Shoe spring free length 2	48 mm (1.89 in)	56.5 mm (2.22 in)
Throttle cable free play	3.0 – 7.0 mm (0.12 – 0.28 in)	----

TIGHTENING TORQUES

CHASSIS

Part to be tightened	Thread size	Tightening torque			Remarks
		Nmm	kg	ft-lb	
Handlebar bracket and lower bracket	M10	53	5.3	39	
Handlebar and handlebar bracket	M8	23	2.3	13	
Brake hose and brake master cylinder	M10	26	2.6	19	
Brake hose and brake caliper	M10	26	2.6	19	
Brake master cylinder and holder	M6	11	1.1	8.0	
Brake master cylinder and brake lever	M6	7	0.7	5.0	
Rear view mirror (left and right)	M10	32	3.2	23	
Front wheel axle nut	M10	40	4.0	29	
Brake hose holder	M6	7	0.7	5.0	
Front fork and brake caliper	M10	35	3.5	25	
Bleed screw	M8	6	0.6	4.3	
Front fork cap bolt	M20	50	5.0	36	
Lower bracket pinch bolt	M10	43	4.3	31	
Damper rod bolt	M8	23	2.3	17	LT
Upper ring nut	M25	75	7.5	54	See NOTE
Lower ring nut	M25	30	3.0	22	See NOTE
Brake disc and wheel hub	M8	23	2.3	17	LT
Brake camshaft and brake camshaft lever	M6	7	0.7	5.0	
Driven sprocket and rear wheel drive hub	M8	30	3.0	22	
Rear wheel axle nut	M12	60	6.0	43	
Rear shock absorber and frame	M10	46	4.6	33	
Rear shock absorber and swingarm	M10	46	4.6	33	
Swingarm pivot nut	M12	66	6.6	48	
Engine mounting nut	M8	34	3.4	25	
Engine mounting nut	M10	72	7.2	52	
Swingarm and drive chain case	M6	7	0.7	5.0	
Drive chain adjuster locknut	M6	7	0.7	5.0	
Swingarm and brake torque rod	M8	16	1.6	12	
Brake shoe plate and brake torque rod	M8	19	1.9	14	
Rider footrest and crankcase	M8	23	2.3	17	
Passenger footrest and frame	M8	30	3.0	22	
Sidestand and rider footrest (bolt)	M8	26	2.6	19	
Sidestand and rider footrest (nut)	M8	17	1.7	12	
Front cowling bracket and crankcase cover (left and right)	M6	7	0.7	5.0	
Main switch and frame	M6	10	1.0	7.2	
Ignition coil and frame	M6	7	0.7	5.0	

MAINTENANCE SPECIFICATIONS**SPEC**

Part to be tightened	Thread size	Tightening torque			Remarks
		Nmm•kg	ft•lb		
Fuel tank and frame	M6	7	0.7	5.0	
Fuel cock and fuel tank	M6	7	0.7	5.0	
Seat and seat bracket	M6	7	0.7	5.0	

NOTE:

1. First tighten the lower ring nut 30 Nm (3.0 m • kg, 22 ft • lb) by using a torque wrench, then loosen the ring nut 1/4 turn.
2. Then, hold the lower ring nut and tighten the upper ring nut 75 Nm (7.5 m • kg, 54 ft • lb) by using a torque wrench.

ELECTRICAL

Item	Standard	Limit
System voltage	12 V	----
Ignition system		
Ignition timing (B.T.D.C.)	10° at 1,400 r/min	----
Advanced type	Digital	----
DC-C.D.I		
Pickup coil resistance/color	248 – 372 Ω at 20 ° C (68 ° F)/R–W	----
C.D.I. unit model/manufacturer	5YP/PTMORIC	----
Ignition coil		
Model/manufacturer	4ST/PTMORIC	----
Minimum ignition spark gap	6 mm	----
Primary coil resistance	0.32 – 0.48 Ω at 20 ° C (68 ° F)	----
Secondary coil resistance	5.68 – 8.52 k Ω at 20 ° C (68 ° F)	----
Spark plug cap		
Material	Resin	----
Resistance	5.0 k Ω	----
Charging system		
Type	A.C. magneto	----
Model/manufacturer	F5YP/PTMORIC	----
Nominal output	14 V 105 W at 5,000 r/min	----
Lighting coil resistance/color	0.29 – 0.43 Ω at 20 ° C (68 ° F)/Y–B	----
Charging coil resistance/color	0.38 – 0.58 Ω at 20 ° C (68 ° F)/W–B	----
Rectifier/regulator		
Regulator type	Semiconductor short-circuit	----
Model/manufacturer	SH656A-12/THA-SHINDENGEN	----
No load regulated voltage (DC)	14.1 – 14.9 V	----
(AC)	12.3 – 13.3 V	----
Rectifier capacity (DC)	8 A	----
(AC)	12 A	----
Withstand voltage	600 V	----
Battery		
Specific gravity	1.280	----

MAINTENANCE SPECIFICATIONS

SPEC

Item	Standard	Limit
Electric starting system (T135SE)		
Type	Constant mesh	----
Starter motor		
Model/manufacture	5YP/PTMORIC	----
Operation voltage	12 V	----
Power output	0.20 kW	----
Armature coil resistance	0.032 – 0.039 Ω at 20 ° C (68 ° F)	----
Brush overall length	7.0 mm (0.28 in)	3.5 mm (0.14 in)
Spring force	3.92 – 5.88 N (400-600 gf, 14.11 – 21.17 oz)	3.92 N (400 gf)
Commutator diameter	17.6 mm (0.69 in)	16.6 mm (0.65 in)
Mica undercut (depth)	1.35 mm (0.05 in)	----
Starter relay (T135SE)		
Model/manufacture	G4R/THA-OMRON	----
Amperage rating	50 A	----
Coil resistance	54 – 66 Ω at 20 ° C (68 ° F)	----
Horn		
Type	Plane	----
Quantity	1	----
Model/manufacture	GF-12/THA-NIKKO	----
Max. amperage	1.5 A	----
Performance	95 – 105 db (2 m)	----
Coil resistance	4.30 – 4.80 Ω at 20 ° C (68 ° F)	----
Turn signal relay		
Relay type	Condenser	----
Model/manufacture	FZ222SD/THA-DENSO	----
Self-canceling device built-in	No	----
Flasher frequency	75 – 95 cycle/min	----
Wattage	10 W · 2 + 3.4 W	----
Fuel gauge		
Model/manufacture	5YP/THA-NIPPON SEIKI	----
Sender unit resistance- full	4 – 10 Ω at 20 ° C (68 ° F)	----
- empty	90 – 100 Ω at 20 ° C (68 ° F)	----
Circuit breaker		
Circuit breaker type	Fuse	----
Main	10 A	----
Reserve	10 A	----

CONVERSION TABLE/ GENERAL TIGHTENING TORQUE SPECIFICATIONS

SPEC

EAS00028

CONVERSION TABLE

All specification data in this manual are listed in SI and METRIC UNITS.

Use this table to convert METRIC unit data to IMPERIAL unit data.

Ex.

METRIC	MULTIPLIER		IMPERIAL
** mm	0.03937	=	** in
2 mm	0.03937	=	0.08 in

CONVERSION TABLE

METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Tightening torque		7.233	l
		86.794	i l
		0.0723	l
		0.8679	i l
Weight	kg	2.205	lb
	g	0.03527	oz
Speed	km/hr	0.6214	mph
Distance	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
Volume/ Capacity	cc (cm ³)	0.03527	oz (IMP liq.)
	cc (cm ³)	0.06102	cu.in
	lt (liter)	0.8799	qt (IMP liq.)
	lt (liter)	0.2199	gal (IMP liq.)
Misc.	kg/mm	55.997	lb/in
	kg/cm ²	14.2234	psi (lb/in ²)
	Centigrade (°C)	9/5+32	Fahrenheit (°F)

EAS00029

GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.

A: Width across flats

B: Thread diameter

A (nut)	B (bolt)	General tightening torques	
		Nm	m·kg
10 mm	6 mm	6	0.6
12 mm	8 mm	15	1.5
14 mm	10 mm	30	3.0
17 mm	12 mm	55	5.5
19 mm	14 mm	85	8.5
22 mm	16 mm	130	13.0

LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE

Lubrication point	Lubricant
Oil seal lips	
Bearings	
O-rings	
Cylinder head tightening washer and bolt thread	
Rocker arm inner surfaces	
Rocker arm shaft	
Camshaft	
Valve stem (IN, EX)	
Valve stem guide (IN, EX)	
Piston pin	
Piston outside and ring groove	
Piston ring	
Cylinder inner surface	
Starter clutch gear inner surface	
Starter idle gear inner surface	
Kickstarter ratchet wheel and ratchet wheel guide	
Kickstarter gear inner surface	
Kickstarter shaft	
Primary driven gear and primary drive gear 2 inner surface	
Clutch push rod #1, #2, ball and main axle inside surface	
Clutch housing inside surface and crankshaft outer surface	
Clutch boss housing, clutch plate and friction plate inside surface	
Clutch boss nut and lock washer contact surface	
Clutch shoe housing inner surface	
Cage	
Clutch shoe housing boss	
Oil pump assembly	
Shift guide inner surface	
Shift fork guide bar	
Shift shaft thrust surface	
Shift lever inner surface	
Shift shaft stopper lever inner surface	
Timing chain	
Transmission wheel gears inner surface	

LUBRICATION POINTS AND LUBRICANT TYPES**SPEC**

Lubrication point	Lubricant
Transmission side plate inner surface	
Transmission pinion gears inner surface	
Generator lead grommet	Yamaha bond No.1215
Crankcase mating surface	Yamaha bond No.1215
Timing chain tensioner bolts	Yamaha bond No.1215

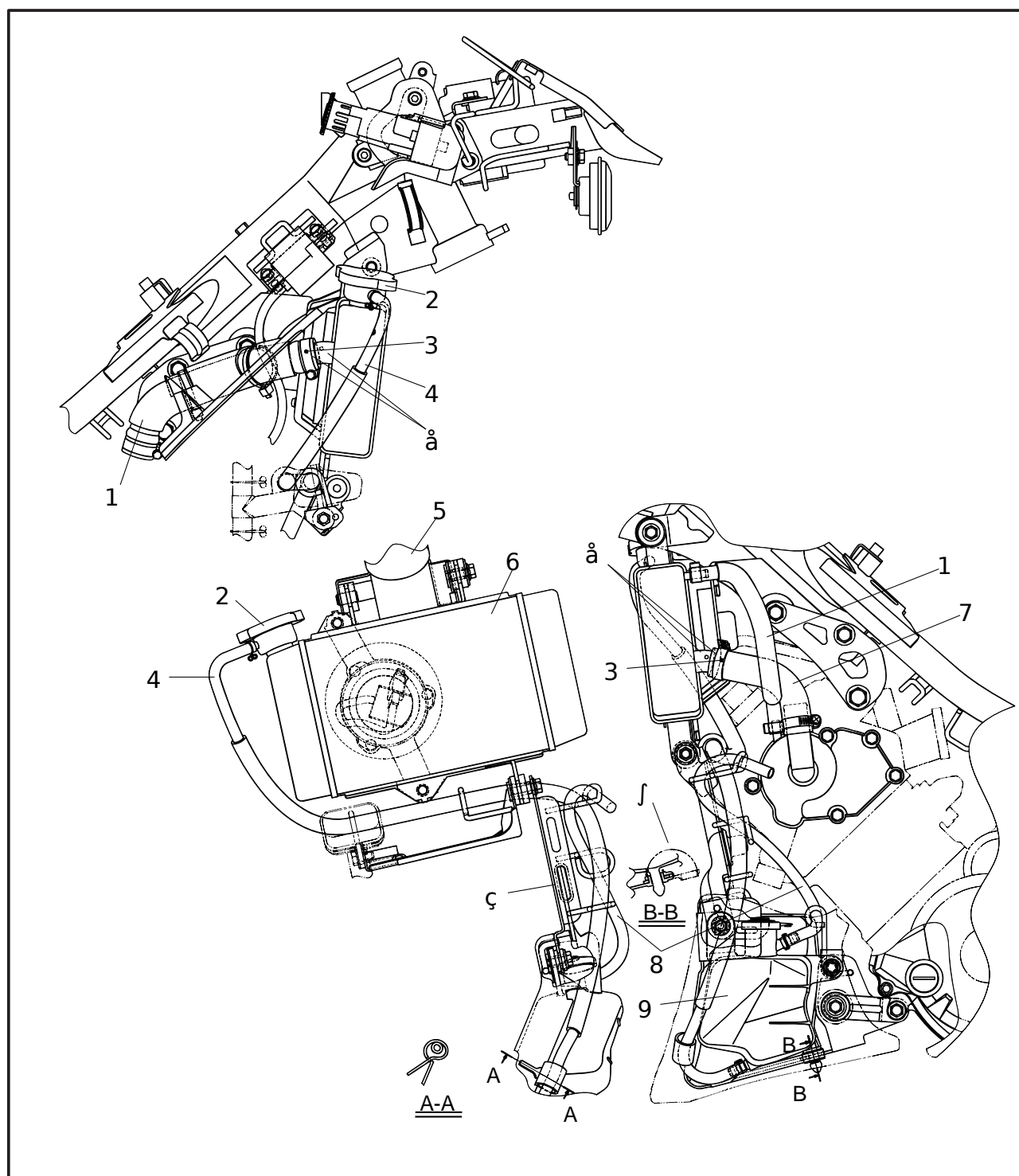
LUBRICATION POINTS AND LUBRICANT TYPES**SPEC****CHASSIS**

Lubrication point	Lubricant
Front wheel oil seal lips	
Speedometer gear unit inner surface	
Rear wheel oil seal lips	
Rear brake camshaft	
Brake torque rod bolt	
Front wheel axle	
Rear wheel axle	
Upper brake caliper retaining bolt	
Lower brake caliper retaining bolt	
Throttle grip tube guide inner surface	
Brake lever pivot bolt	
Steering head bearing inner race	
Steering head bearing outer race	
Steering head upper bearing	
Steering head lower bearing	
Sidestand pivot bolt	
Swingarm pivot shaft	
Centerstand pivot shaft	

COOLING SYSTEM DIAGRAMS

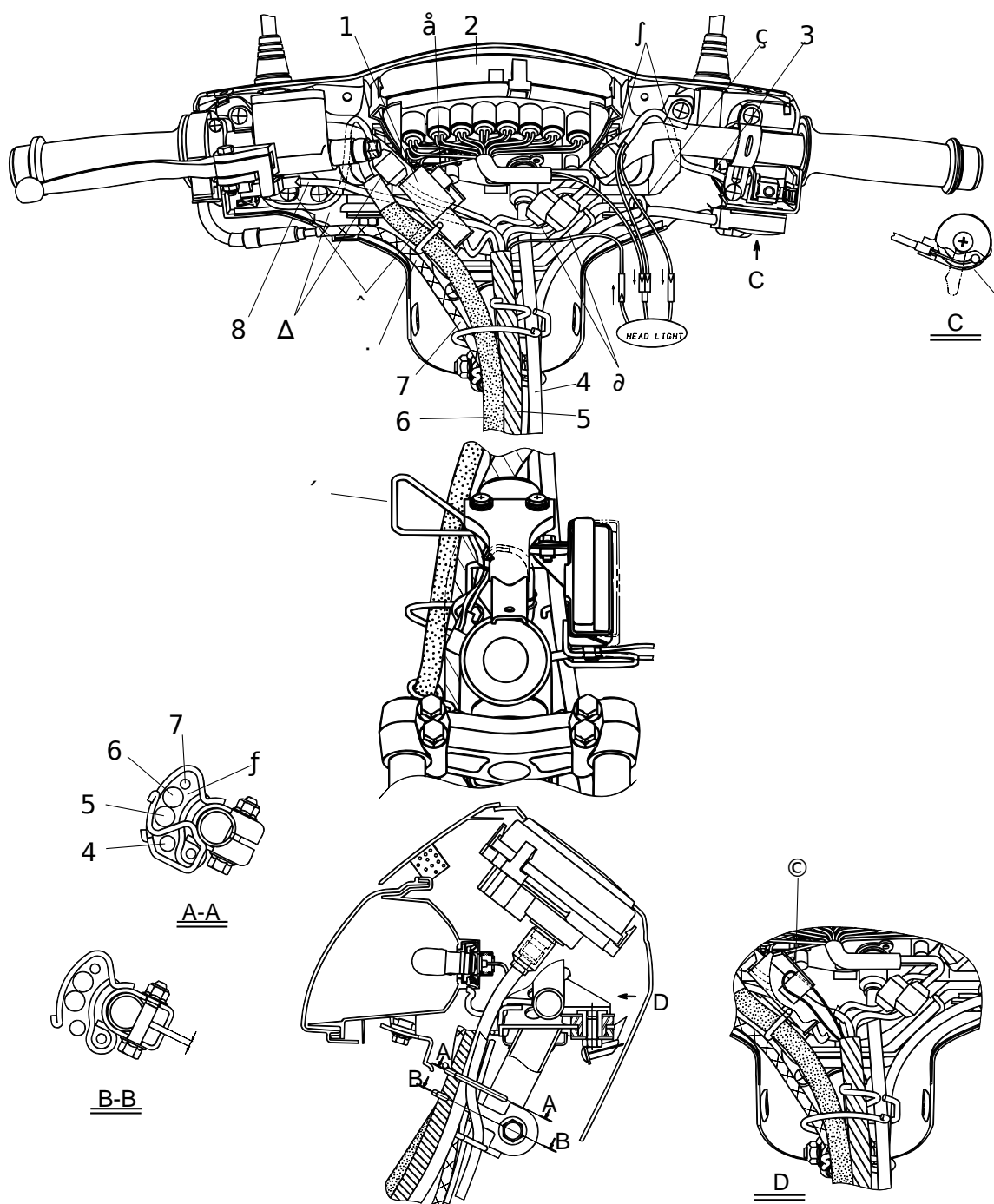
- 1 Radiator inlet hose
- 2 Radiator cap
- 3 Hose clamp
- 4 Coolant reservoir hose
- 5 Frame cross pipe
- 6 Radiator
- 7 Radiator outlet hose
- 8 Over flow hose
- 9 Coolant reservoir tank

- ⌘ Align the white paint mark on the clamp with the white paint mark on the radiator.
- ∫ Band the end of the cover, before install the projection of the reservoir tank.
- ⌘ Install the hook of the cover end into the slit of the bracket.

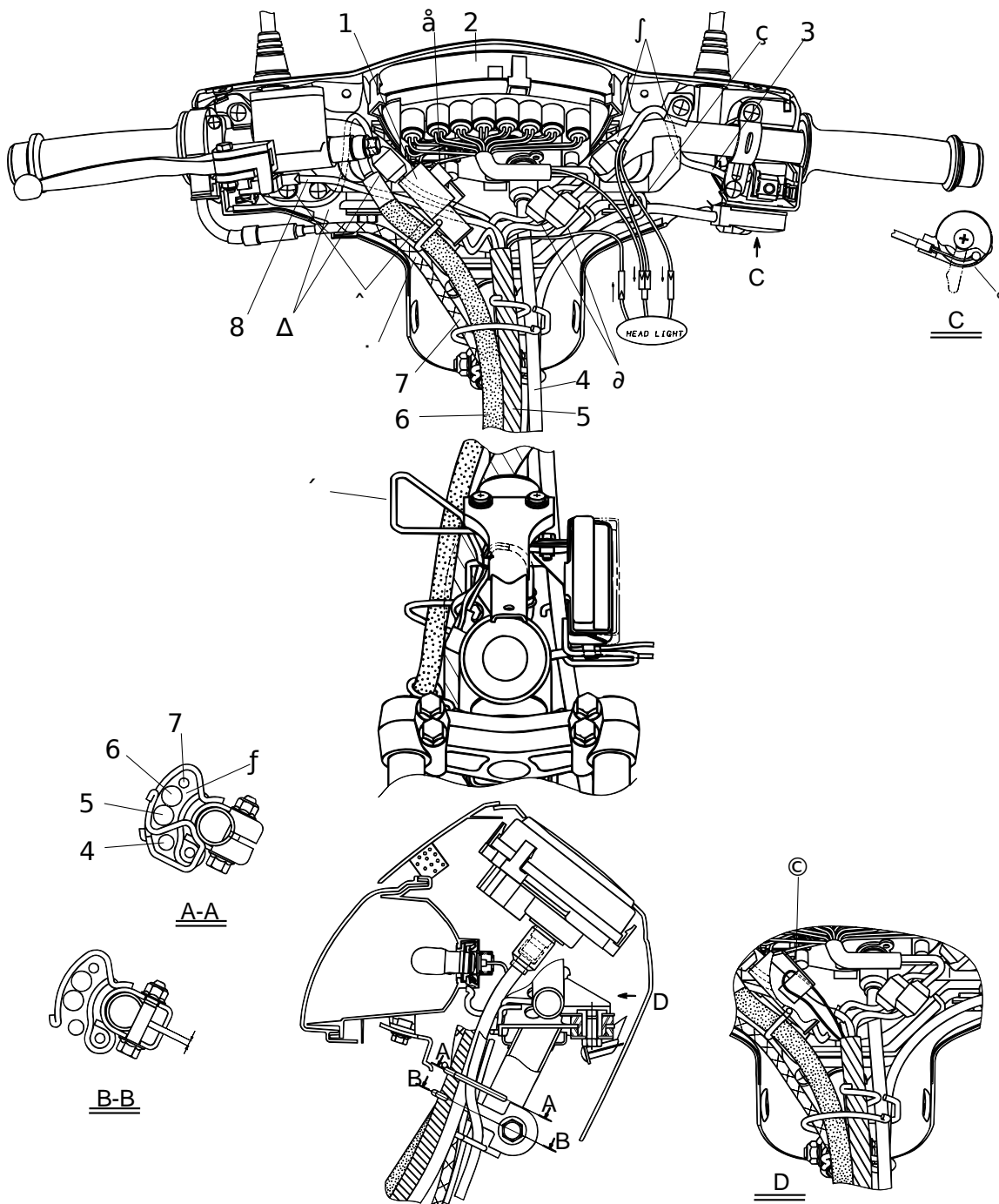


CABLE ROUTING

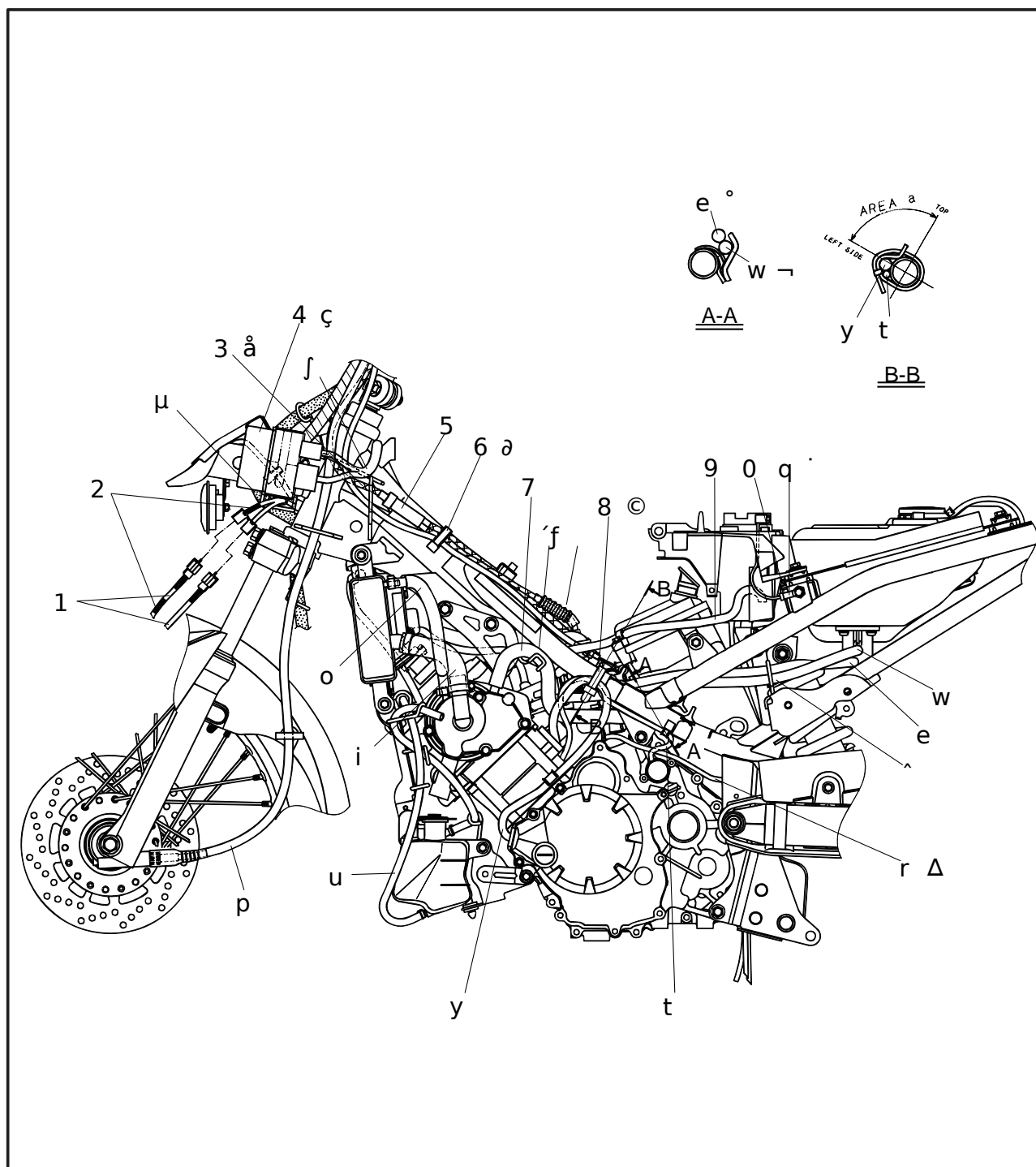
- | | | |
|---------------------------------|--|---|
| 1 Turn signal light relay | â Install the turn signal relay onto the bracket. | f Pass through into the wire guide, follow the routing order. Brake hose, throttle cable and wireharness. |
| 2 Meter assembly | ∫ Connect the left handlebar switch lead coupler in front of the handlebar left. | © Hook the strap of the wireharness onto the bracket. |
| 3 Left handlebar switch lead | ç Pass through the choke cable into the wireharness. | Pass through the brake hose into the wire guide on the handlebar bracket. |
| 4 Speedometer cable | ð Connect the couplers in front of the handlebar left side. | |
| 5 Wireharness | Do not pass the brake hose into the bracket. | |
| 6 Brake hose | | |
| 7 Throttle cable | | |
| 8 Front brake light switch lead | | |



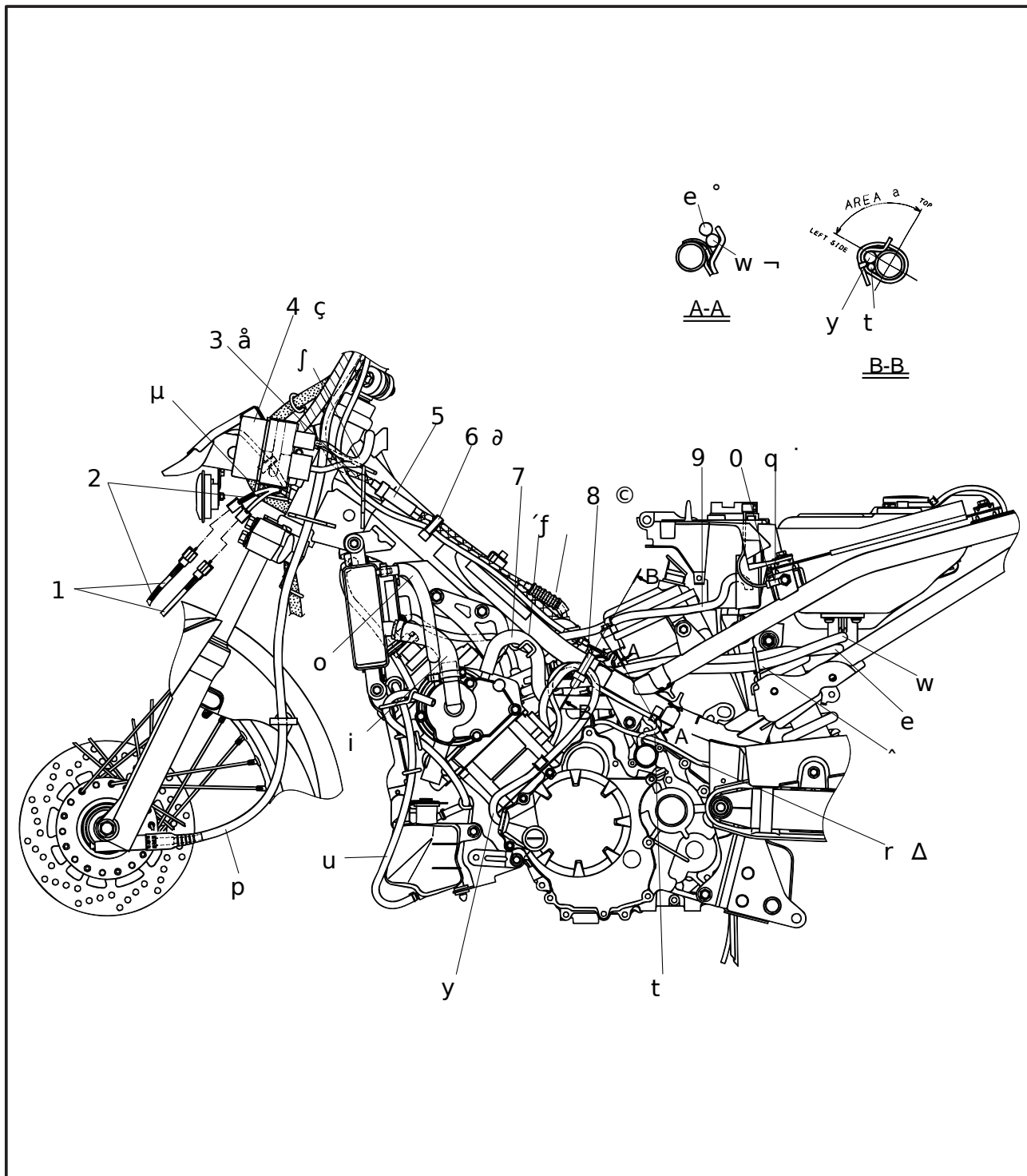
- ^ Pass the wireharness behind the turn signal relay and brake hose, and then connect the front brake switch.
- ° Take care not to bend the choke cable when installing.
- Δ Route the right handlebar switch lead behind the handlebar and connect the coupler with handlebar right side, and then set the turn signal light relay.



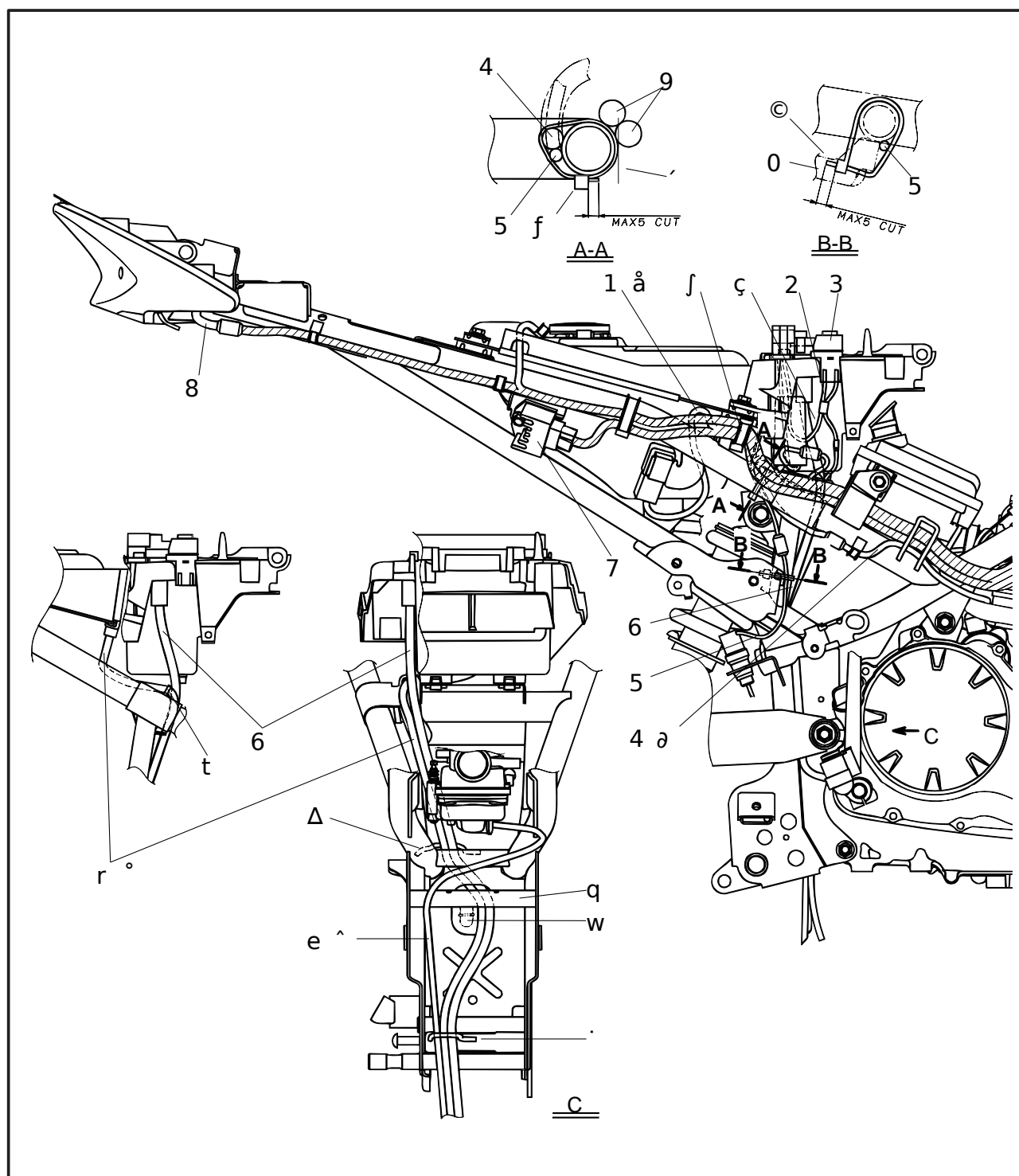
- | | | |
|--------------------------------|--|---|
| 1 Front turn signal light lead | t Neutral switch lead | lead in front of the stay. |
| 2 Fitting tape (red) | y A.C. magneto lead | ∂ Check that the connection of the acceleration pump cable from case, after adjusting and clamp the throttle cable and acceleration pump cable. |
| 3 Throttle cable | u Coolant reservoir hose | Clamp the breather pipe. |
| 4 C.D.I. unit | i Water pump inlet hose | f Cover the throttle cable adjusting nut completely. |
| 5 Case | o Radiator outlet hose | © Clamp the neutral switch lead and A.C. magneto lead with clamp. |
| 6 Clamp | p Speedometer cable | |
| 7 Breather pipe | | |
| 8 Band | å Route inside of the choke cable. | |
| 9 Air vent pipe | f Pass through the throttle cable, choke cable and speedometer cable into the cable guide. | |
| 0 Stopper | ç Pass through the C.D.I. unit | |
| q Negative lead | | |
| w Fuel hose | | |
| e Vacuum hose | | |
| r Overflow pipe | | |



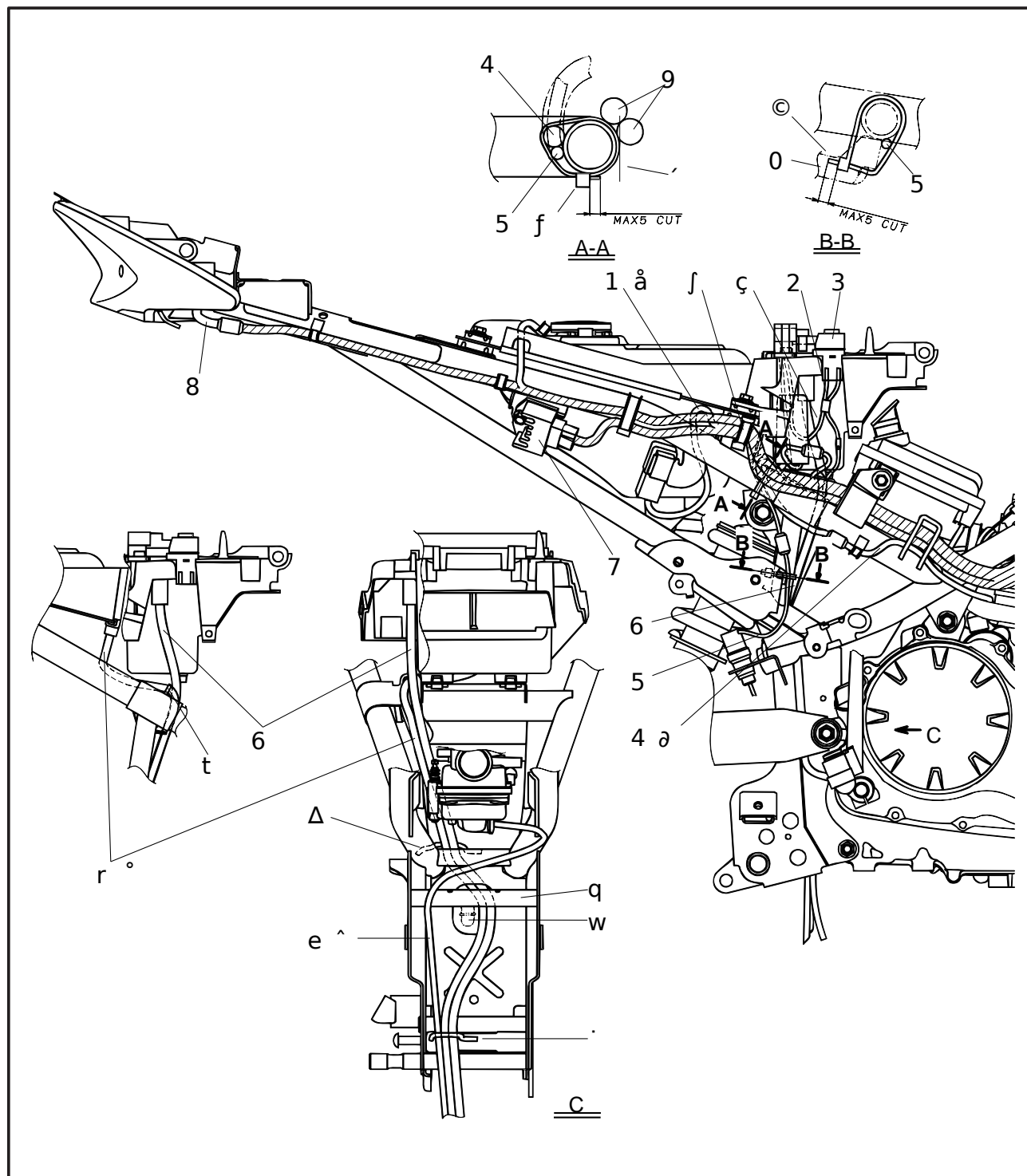
- Install the negative lead, should be stopped.
- ^ Pass through the fuel hose and vacuum hose into the cable guide.
- Δ Route the overflow pipe to the left side of the engine and inside of the neutral switch lead.
- ° Route the vacuum hose onto the fuel hose.
- ↵ Route the fuel hose onto the cable guide.
- μ Pass through the turn signal light lead into the guide.



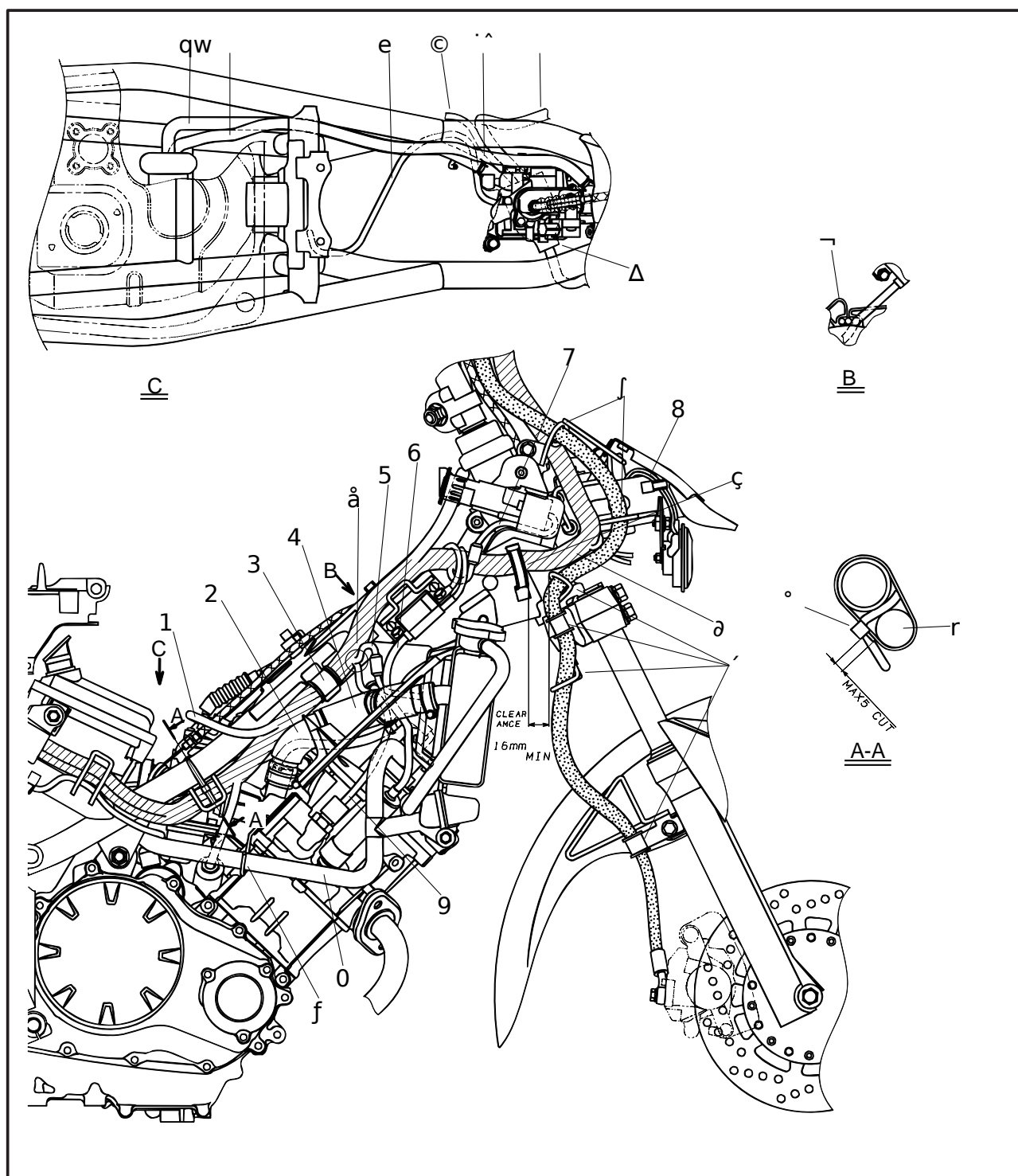
- | | | |
|-------------------------------|---|---|
| 1 Fan relay lead | e Overflow pipe | ð Pass through the starter motor lead under the wireharness. (T135SE) |
| 2 Positive lead | r Drain hose | Outside of the frame. |
| 3 Fuse box | t Protector | f Be sure does not over the outside of the frame. |
| 4 Starter motor lead (T135SE) | å Pass through the fan relay lead into the frame pipe and fuel tank. | © Set in the connected point to the bracket, after behind them. Pass through the drain hose, battery breather pipe and over flow pipe into the cable guide. |
| 5 Rear brake switch lead | ∫ Close the clamp end until stop contact to the fuel tank. | |
| 6 Battery breather pipe | ç Pass through the positive lead into the starter relay and breather pipe. (T135SE) | |
| 7 Rectifier/regulator | | |
| 8 Tail/brake light lead | | |
| 9 Wireharness | | |
| 0 Bracket | | |
| q Frame | | |
| w Air filter assembly | | |



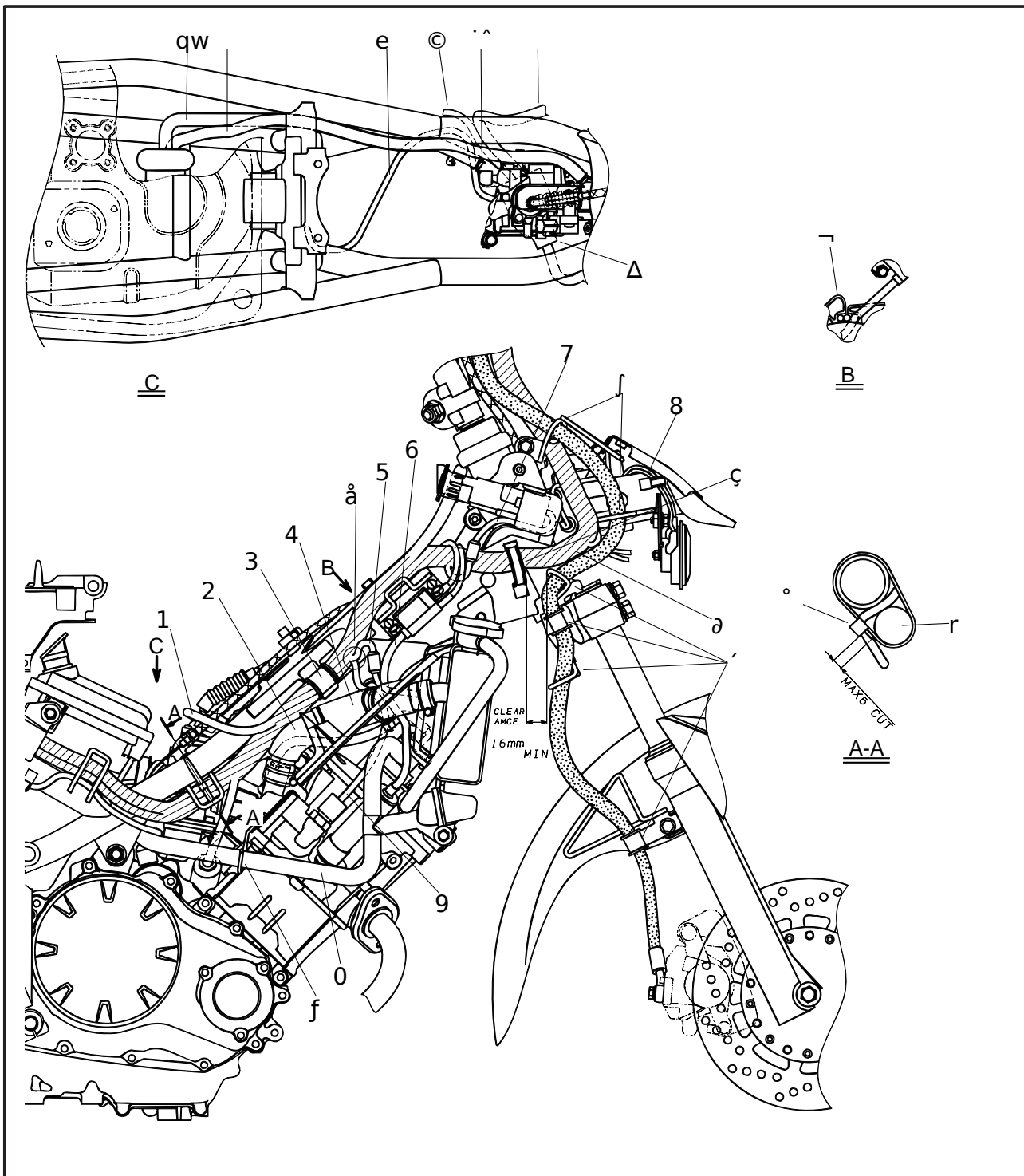
- ^ Route the overflow pipe in front of the cross pipe frame.
- Δ Pass through the drain hose and battery breather pipe into the guide.
- ° Pass through the drain hose into the hole of the protector.



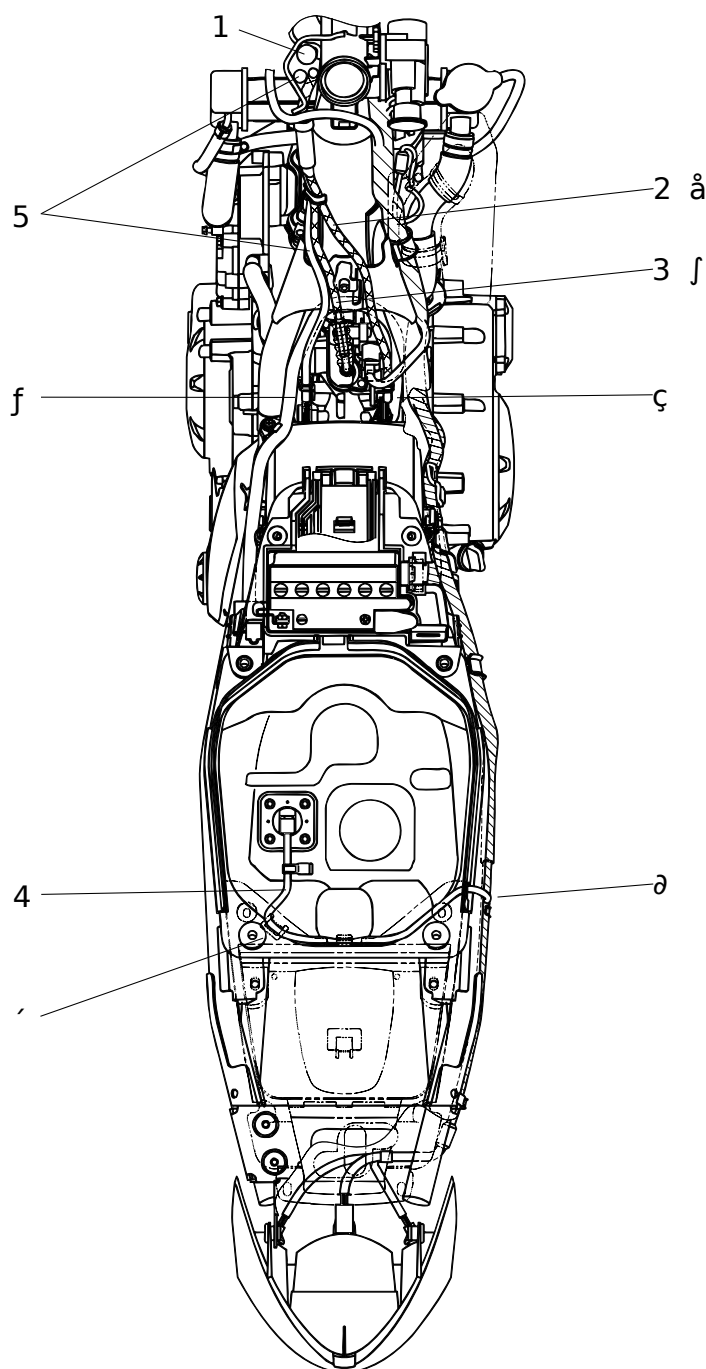
- | | | |
|---------------------------------|---|--|
| 1 Throttle position sensor lead | e Overflow pipe | ð Pass through the wireharness into the main switch and cable guide. |
| 2 Radiator inlet hose | r Wireharness | Pass through the hone lead and turn signal light lead under the wireharness. |
| 3 Grommet | | Route the brake hose as shown. |
| 4 Plate | â Turn the downward of the separate part. | f Clamp the bend hose. |
| 5 Fan motor lead | ∫ Route the brake hose through as shown. | © To the neutral switch. |
| 6 High tension cord | ç Close the clamp certainly. Wireharness and cable guide clearance is wit in 16 mm, when straight the steering condition. | Turn the clip inside without contact the vacuum hose. |
| 7 Main switch lead | | |
| 8 Horn lead | | |
| 9 Thermo switch lead | | |
| 0 Bend hose | | |
| q Fuel hose | | |
| w Vacuum hose | | |



- To the A.C. magneto.
- Δ Cover the protector completely, after the coupler connected.
- Set the connected point below the pipe end.
- ▮ Pass through the high tension cord, fan motor lead and thermo sensor lead into the cut part on the plate.



- 1 Speedometer cable
- 2 Acceleration pump cable
- 3 Throttle cable
- 4 Fuel sender lead
- 5 Choke cable
- â Route the acceleration pump cable into the right side of the stay.
- ƒ Route the throttle cable into the left side of the stay.
- ç Black plating joint.
- ð Pass through the fuel sender lead in to the side hole of the fuel tank.
- ´ Clamp the fuel sender lead onto the hook of the box.
- f White plating joint.



CHAPTER 3

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INTRODUCTION/**CHK** PERIODIC MAINTENANCE AND LUBRICATION INTERVALS**ADJ**

EAS00036

PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EAS00037

PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (: 1000 km)					ANNUAL CHECK
			1	6	12	18	24	
1	* Fuel line	9Check fuel and vacuum hoses for cracks or damage.		√√√	√√			
2	Spark plug	9Check condition.		√		√		
		9Clean and regap.						
		9Replace.			√		√	
3	* Valves	9Check valve clearance. 9Adjust.		√√	√√			
4	Air filter element	9Clean.		√		√		
		9Replace.			√		√	
5	* Battery	9Check electrolyte level and specific gravity. 9Make sure that the breather hose is properly routed.		√	√√	√		√
6	* Front brake	9Check operation, fluid level and vehicle for fluid leakage.	√√√	√√√				
		9Replace brake pads.	Whenever worn to the limit					
7	* Rear brake	9Check operation and adjust brake pedal free play.	√√√	√√√				
		9Replace brake shoes.	Whenever worn to the limit					
8	* Brake hose	9Check for cracks or damage.	√	√√√	√√			
		9Replace.	Every 4 years					
9	* Wheels	9Check runout, spoke tightness and for damage. 9Tighten spokes if necessary.		√√	√		√	
10	Tires	9Check tread depth and for damage. 9Replace if necessary. 9Check air pressure. 9Correct if necessary.		√√√	√		√	
11	Wheel bearings	9Check bearing for looseness or damage.		√√	√		√	
12	Swingarm	9Check operation and for excessive play.		√√	√√			
		9Lubricate with lithium-soap-based grease.	Every 24000 km					
13	Drive chain	9Check chain slack, alignment and condition. 9Adjust and thoroughly lubricate chain with engine oil.	Every 500 km and after washing the motorcycle or riding in the rain					
14	Steering bearings	9Check bearing play and steering for roughness.	√√√	√√				
		9Lubricate with lithium-soap-based grease.	Every 24000 km					
15	Chassis fasteners	9Make sure that all nuts, bolts and screws are properly tightened.		√√√	√√			
16	Sidestand, centerstand	9Check operation. 9Lubricate.		√√√	√√			
17	Front fork	9Check operation and for oil leakage.		√√	√√			
18	Shock absorber assembly	9Check operation and shock absorber for oil leakage.		√√	√√			
19	Carburetor	9Check starter (choke) operation. 9Adjust engine idling speed.	√√√	√√√				
20	Engine oil	9Change. 9Check oil level and vehicle for oil leakage.	√√√	√√√				
21	Engine oil filter element	9Replace.	√		√√			

PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

CHK
ADJ

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (: 1000 km)					ANNUAL CHECK
			1	6	12	18	24	
22	Cooling system	9 Check coolant level and vehicle for coolant leakage. 9 Change the YAMAHA GENUINE COOLANT.		✓✓✓	✓✓			
			Every 3 years					
23	Front and rear brake switches	9 Check operation.	✓✓✓	✓✓				
24	Moving parts and cables	9 Lubricate.		✓✓✓	✓✓			
25	Throttle grip housing and cable	9 Check operation and free play. 9 Adjust the throttle cable free play if necessary. 9 Lubricate the throttle grip housing and cable.		✓✓✓	✓✓			
26	Air induction system	9 Check the air cut-off valve, reed valve, and hose for damage. 9 Replace any damaged parts if necessary.		✓✓✓	✓✓			
27	Lights, signals and switches	9 Check operation. 9 Adjust headlight beam.	✓✓✓	✓✓				

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NOTE:

- 7 The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- 7 Hydraulic brake service
 - 9 Regularly check and, if necessary, correct the brake fluid level.
 - 9 Every two years replace the internal components of the brake master cylinder and caliper, and change the brake fluid.
 - 9 Replace the brake hoses every four years and if cracked or damaged.

EASF0004

COVERS
REMOVING THE SIDE COWLINGS

1. Remove:
 - 9screws
 - 9bolts
 - 9side cowlings (left and right)

INSTALLING THE SIDE COWLINGS

For installation, reverse the removal procedure.

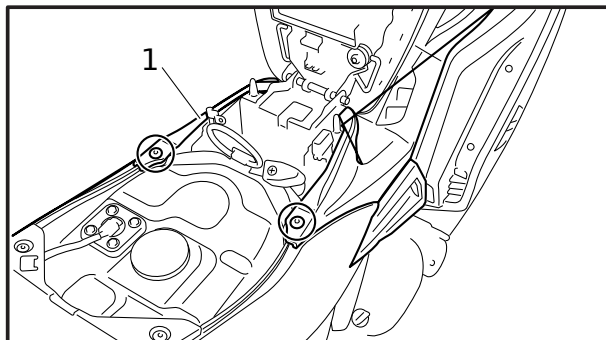
REMOVING THE FRONT COWLING

1. Remove:
 - 9screws
 - 9front cowling

2. Disconnect:
 - 9turn signal light couplers

INSTALLING THE FRONT COWLING

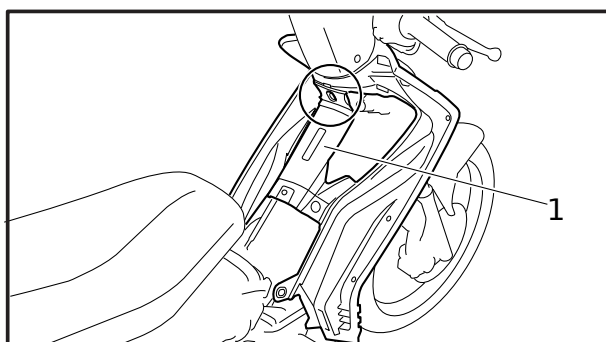
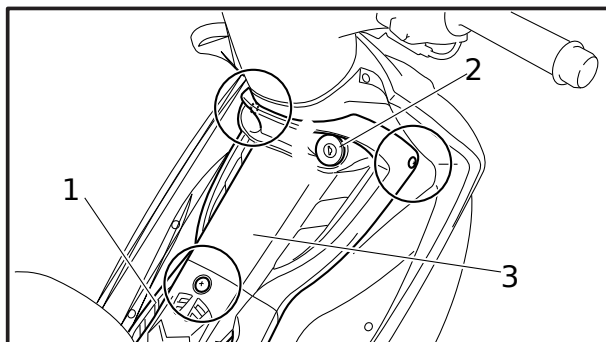
For installation, reverse the removal procedure.

**REMOVING THE CENTER PANELS**

1. Remove:
 - 9screws
 - 9center panel (lower) 1
 - 9main switch cover 2
 - 9screws
 - 9center panel (upper) 3

NOTE:

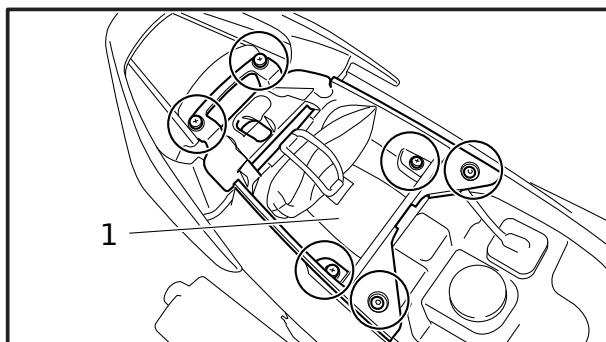
Remove the main switch cover by turning it in the direction of the arrow shown.



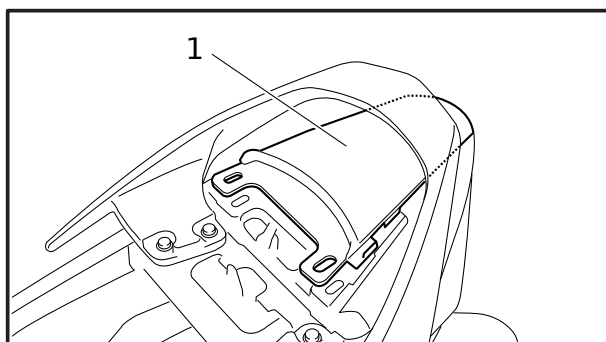
2. Remove:
 - 9screw
 - 9 inner panel 1

INSTALLING THE CENTER PANELS

For installation, reverse the removal procedure.

**REMOVING THE REAR COWLINGS**

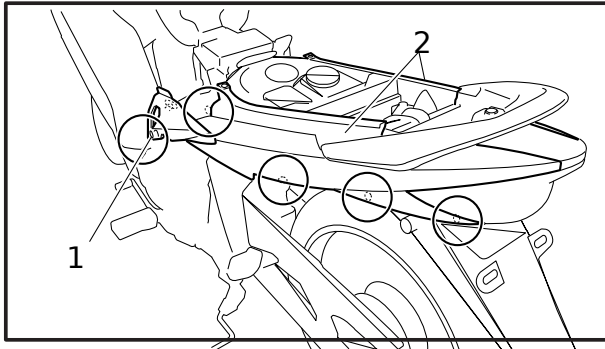
1. Remove:
 - 9screws
 - 9center panel (lower)
2. Remove:
 - 9screws
 - 9storage compartment 1



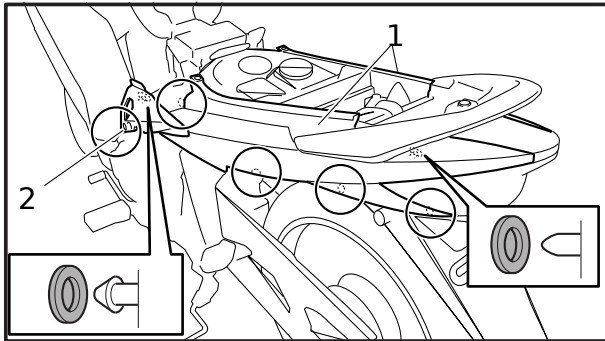
3. Remove:
 - 9rear panel 1

NOTE:

Remove the rear panel by sliding it in the direction shown.



4. Remove:
- 9screws
 - 9screw (with washer) 1
 - 9screws
 - 9rear cowlings (left and right) 2

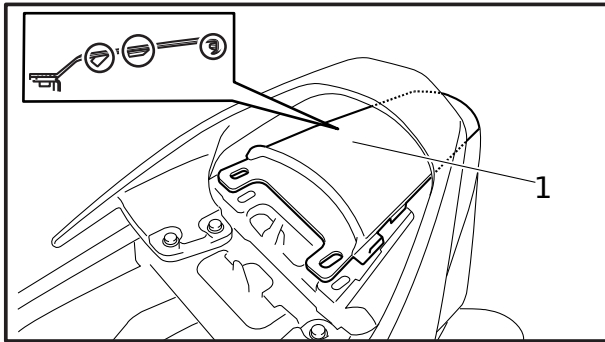


INSTALLING THE REAR COWLINGS

1. Install:
- 9rear cowlings (left and right) 1
 - 9screws
 - 9screw (with washer) 2

NOTE:

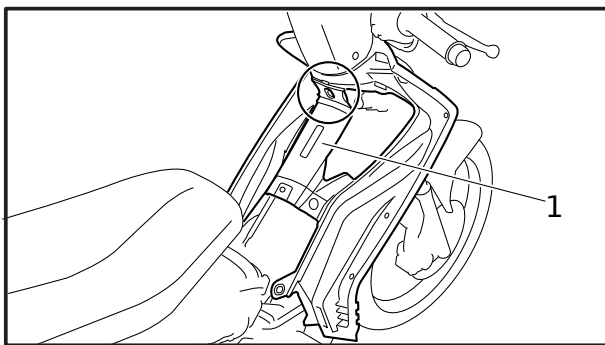
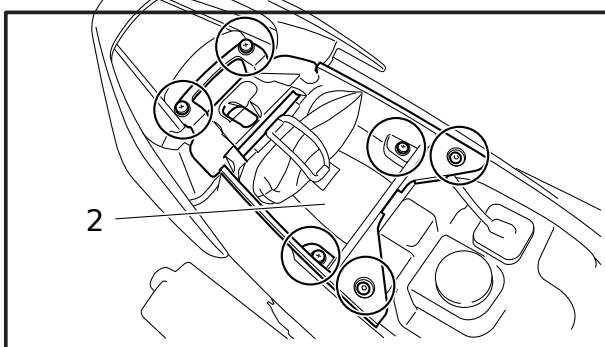
Before tightening the rear cowling screws, make sure that all projections (left and right) are securely fitted.



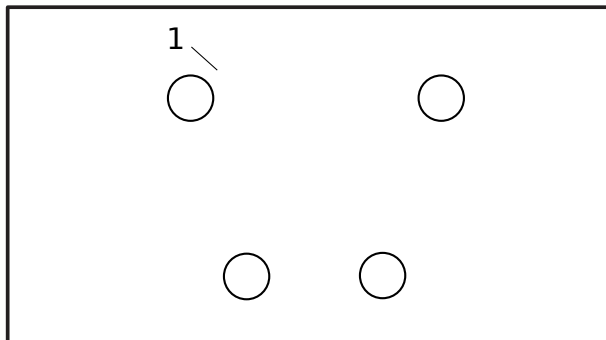
2. Install:
- 9rear panel 1
 - 9storage compartment 2
 - 9screws

NOTE:

Make sure that all projections are securely fitted.

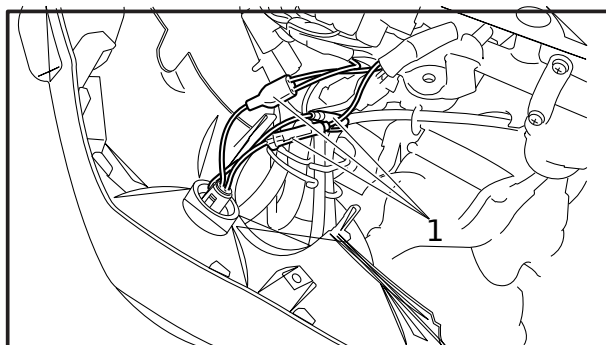
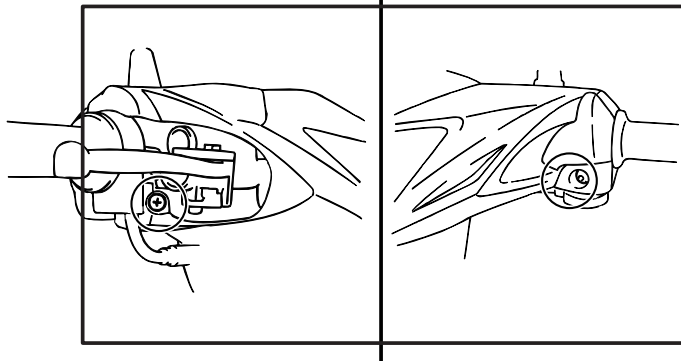


3. Install:
- 9center panel (upper) 1
 - 9screw



REMOVING THE HEADLIGHT ASSEMBLY

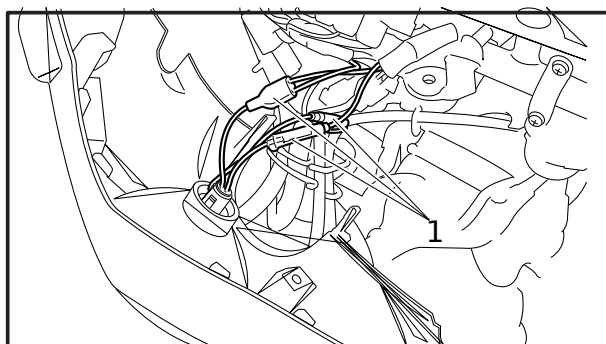
1. Remove:
 - 9screws
 - 9headlight assembly 1



2. Disconnect:
 - 9headlight connectors 1

INSTALLING THE HEADLIGHT ASSEMBLY

1. Connect:
 - 9headlight connectors 1
2. Install:
 - 9headlight assembly
 - 9screws



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ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

NOTE:

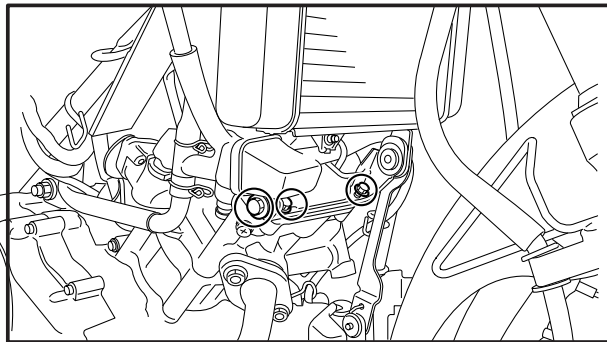
- 9Valve clearance adjustment should be made on a cold engine, at room temperature.
- 9When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:

- 9side cowlings (left and right)
 - 9front cowling
- Refer to "REMOVING THE SIDE COWLINGS" AND "REMOVING THE FRONT COWLING".

2. Drain:

- 9cooling system
- Refer to "CHANGING THE COOLANT".

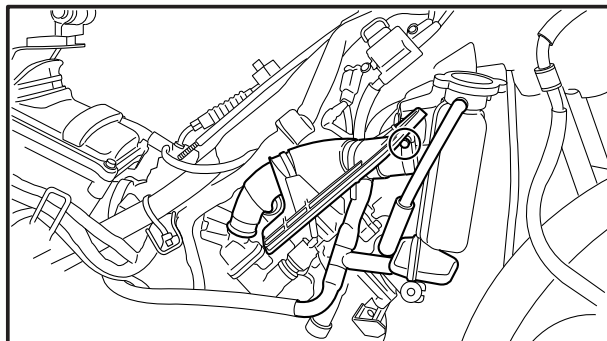


3. Remove:

- 9AIS resonator mount bolt
 - 9AIS resonator
 - 9spark plug
 - 9bracket
- Refer to "CHANGING THE COOLANT".

C

Be sure to remove the AIS hose, before removing the AIS resonator, otherwise to brake the AIS resonator mount.

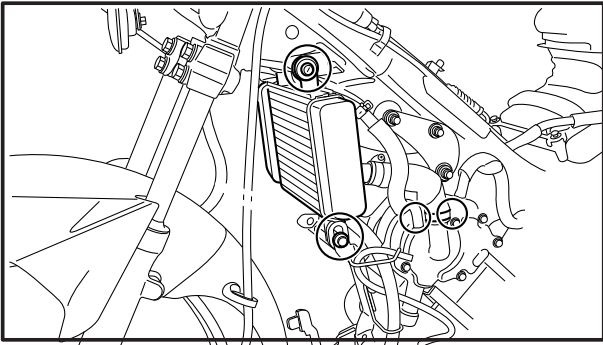


4. Disconnect:

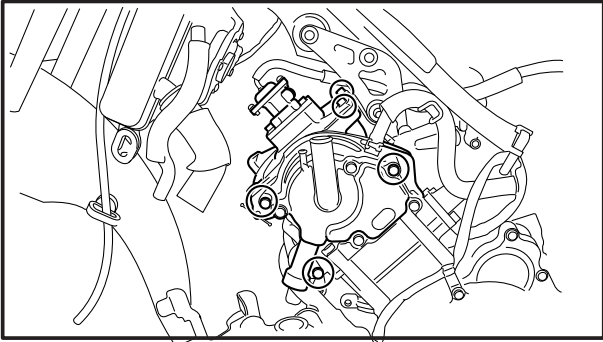
- 9radiator inlet hose
- 9radiator outlet hose
- 9water pump inlet hose

ADJUSTING THE VALVE CLEARANCE

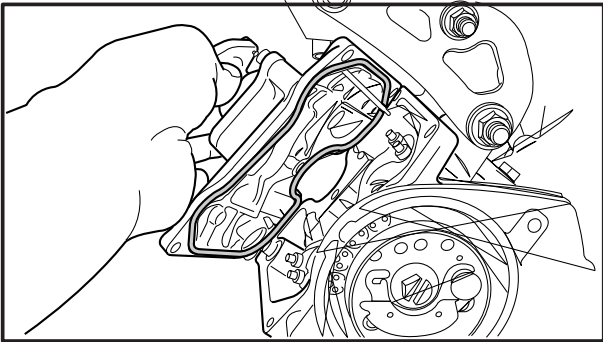
CHK
ADJ



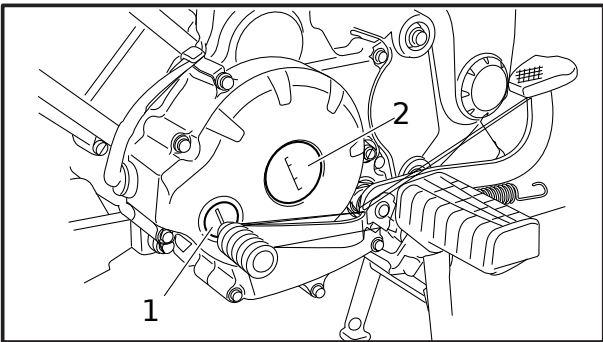
5. Move:
9radiator assembly
To swing the radiator assembly toward the front side.



6. Remove:
9water pump assembly
9O-rings



7. Remove:
9cylinder head cover
9gasket



8. Remove:
9timing check plug 1
(with O-ring)
9center plug 2
(with O-ring)
9. Measure:
9valve clearance
Out of specification → Adjust.

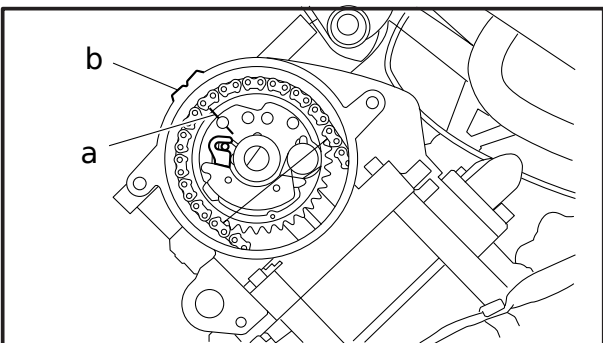
Valve clearance (cold)

Intake valve

0.10–0.14 mm (0.0039–0.0055 in)

Exhaust valve

0.16–0.20 mm (0.0063–0.0079 in)

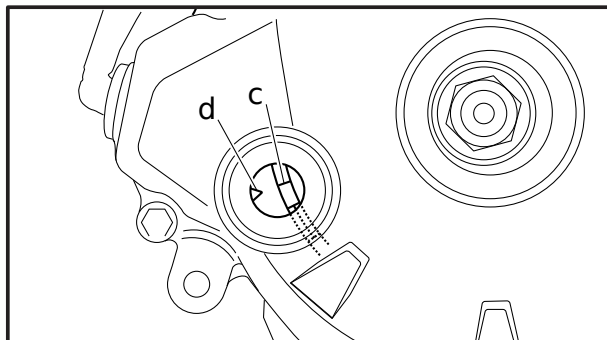


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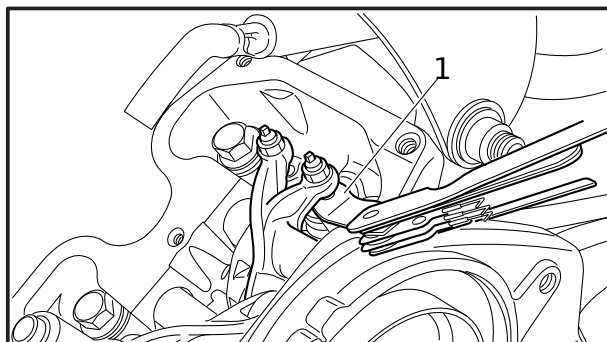
- a. Turn the crankshaft counterclockwise.
- b. When the piston is at TDC on the compression stroke, align the "I" mark a on the camshaft sprocket with the stationary point b on the cylinder head.

ADJUSTING THE VALVE CLEARANCE

CHK
ADJ

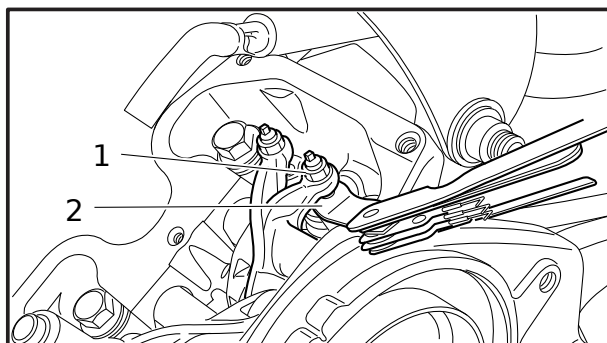


- c. Align the TDC mark **c** on the generator rotor with the stationary pointer **d** on the crankcase cover.



- d. Measure the valve clearance with a thickness gauge **1**.
Out of specification → Adjust.

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10. Adjust:

9 valve clearance

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- a. Loosen the locknut **1**.
b. Insert a thickness gauge **2** between the end of the adjusting screw and the valve tip.
c. Turn the adjusting screw **3** in direction **a** or **b** until the specified valve clearance is obtained.

Direction aa	Valve clearance is increased.
Direction bb	Valve clearance is decreased.

	Tappet adjusting tool 44 90890-01311
--	---

- 9 Hold the adjusting screw to prevent it from moving and tighten the locknut to specification.

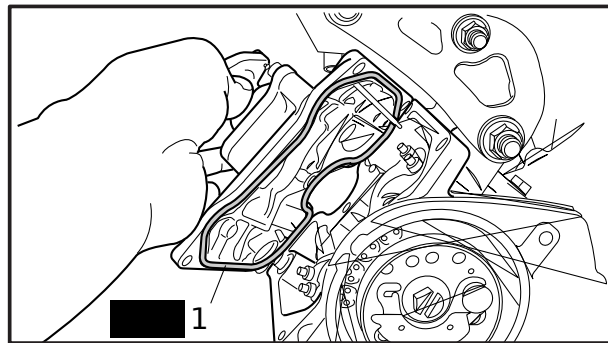
	Locknut 7 Nm (0.7 m·kg, 5.0 ft·lb)
--	---

- d. Measure the valve clearance again.
e. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

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ADJUSTING THE VALVE CLEARANCE

CHK
ADJ



11. Install:
 - 9O-ring [REDACTED]
 - 9timing check plug
(with O-ring) 7 Nm (0.7 m•kg, 5.0 ft•lb)
 - 9center plug
(with O-ring) 7 Nm (0.7 m•kg, 5.0 ft•lb)

12. Install:
 - 9gasket 1 [REDACTED]
 - 9cylinder head cover 10Nm (1.0 m•kg, 7.2 ft•lb)

13. Install:
 - 9O-ring [REDACTED]
 - 9water pump assembly 10Nm (1.0 m•kg, 7.2 ft•lb)

14. Connect
 - 9water pump inlet hose
 - 9radiator outlet cover
 - 9radiator inlet hose

15. Install:
 - 9AIS resonator
 - 9AIS resonator mount bolt
 - 9spark plug 12.5Nm (1.25 m•kg, 9.0 ft•lb)

16. Fill:
 - 9cooling system
 - Refer to "CHANGING THE COOLANT".

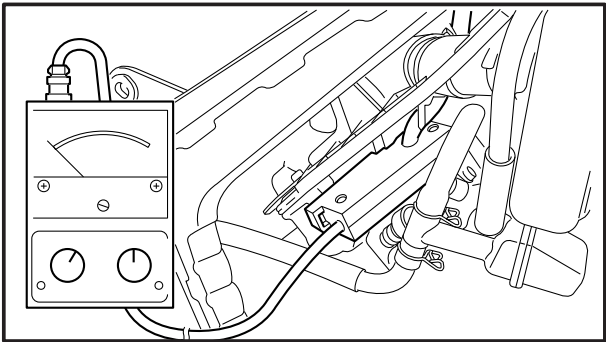
17. Install:
 - 9front cowling
 - 9side cowlings (left and right)
 - Refer to "INSTALLING THE SIDE COWLINGS" and "INSTALLING THE FRONT COWLING".

EAS00054

ADJUSTING THE ENGINE IDLING SPEED

NOTE: Prior to adjusting the engine idling speed, the air filter element should be clean, and the engine should have adequate compression.

- 1. Remove:
 - 9side cowlings (left and right)
 - 9front cowling
 - 9rear cowling (left)Refer to “REMOVING THESIDECOWL-INGS”, “REMOVING THE FRONTCOWL-ING” and “REMOVINGTHEREARCOWL-INGS”.
- 2. Start the engine and let it warm up for sev-eral minutes.
- 3. Connect:
 - 9engine tachometer (onto the spark plug lead)



	Engine tachometer 90890-03113
--	--

- 4. Check:
 - 9engine idling speedOut of specification → Adjust.

	Engine idling speed 1,300–1,500 r/min
--	--

- 5. Adjust:
 - 9engine idling speed

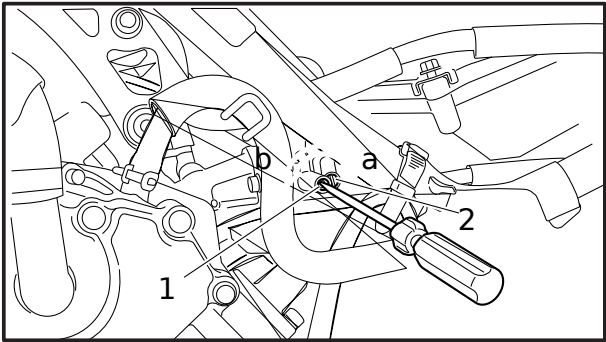
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- a. Turn the pilot air screw 1 in or out until it is lightly seated.
- b. Turn the pilot air screw out the specified number of turns.

Pilot air screw setting 1-5/8 turns out
--

- c. Turn the throttle stop screw 2 in direction a or b until the specified engine idling speed is obtained.

Direction aa	Engine idling speed is increased.
Direction bb	Engine idling speed is decreased.



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ADJUSTING THE ENGINE IDLING SPEED/ ADJUSTING THE THROTTLE CABLE FREE PLAY

CHK	
ADJ	

6. Adjust:
 - 9throttle cable free play
 - Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".

	Throttle cable free play (at the flange of the throttle grip) 3–7 mm (0.12–0.28 in)
--	--

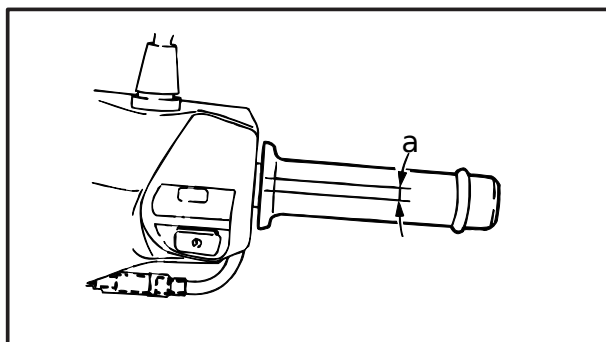
7. Install:
 - 9rear cowling (left)
 - 9front cowling
 - 9side cowlings (left and right)
 - Refer to "INSTALLING THE REAR COWLINGS", "INSTALLING THE FRONT COWLING" and "INSTALLING THE REAR COWLINGS".

EAS00058

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE:

Prior to adjusting the throttle cable free play, the engine idling speed should be adjusted.



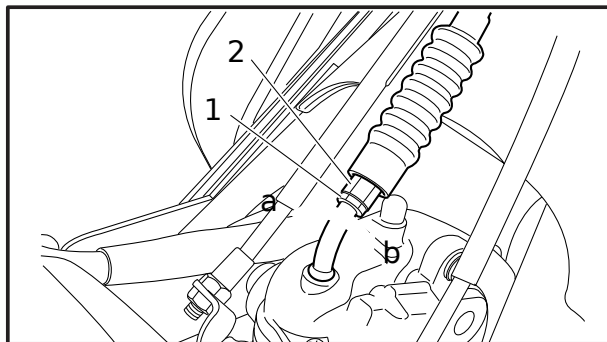
1. Check:
 - 9throttle cable free play a
 - Out of specification → Adjust.

	Throttle cable free play (at the flange of the throttle grip) 3–7 mm (0.12–0.28 in)
--	--

2. Remove:
 - 9center panel (lower)
 - Refer to "REMOVING THE CENTERPANELS".

ADJUSTING THE THROTTLE CABLE FREE PLAY

CHK
ADJ



3. Adjust:

9throttle cable free play

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- Pull back the adjusting nut cover.
- Loosen the locknut 1
- Turn the adjusting nut 2 in direction a or b until the specified throttle cable free play is obtained.

Direction aa	Throttle cable free play is increased.
Direction bb	Throttle cable free play is decreased.

- Tighten the locknut.
- Slide the adjusting nut cover to its original position.

W

After adjusting the throttle cable free play, start the engine and turn the handlebar to the right or left to ensure that this does not cause the engine idling speed to change.

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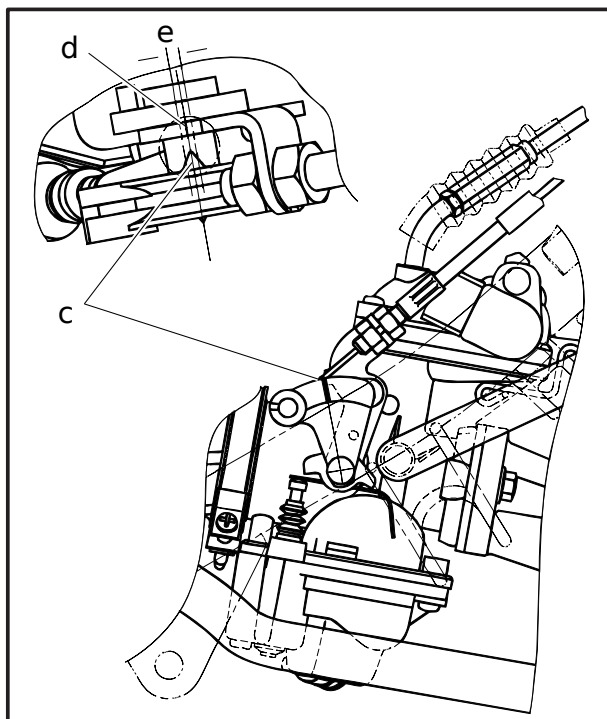
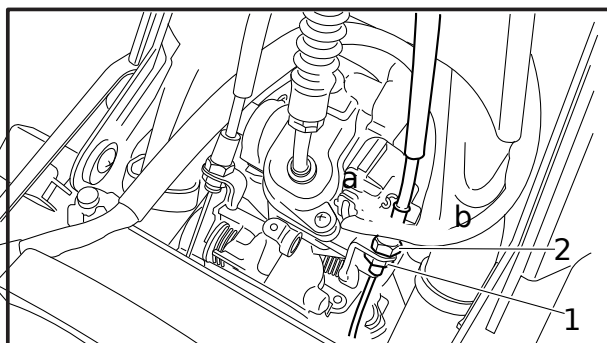
4. Adjust:

9accelerator pump cable

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- Loosen the locknut 1
- Turn the adjusting nut 2 in direction a or b until align the projection c on the accelerator pump lever with projection d on the bracket. (e : within $\pm 1\text{mm}$)
- Tighten the locknut.

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EAS00060

CHECKING THE SPARK PLUG

1. Remove:
 - 9side cowling (right)
Refer to "REMOVING THE SIDE COWL-
INGS".
 - 9AIS resonator

cC

Be sure to remove the AIS hose, before removing the AIS resonator, otherwise to brake the AIS resonator mount.

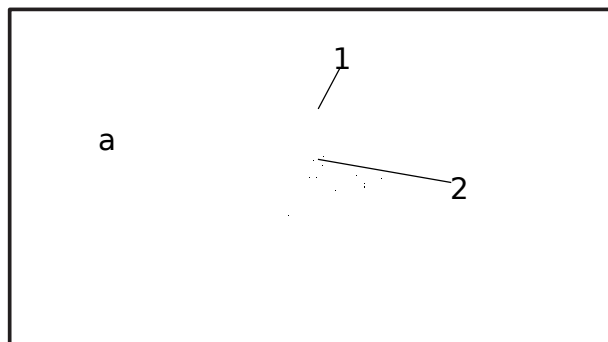
2. Disconnect:
 - 9spark plug cap
3. Remove:
 - 9spark plug

cC

Before removing the spark plug, blow away any dirt accumulated in the spark plug well with compressed air to prevent it from falling into the cylinder.

4. Check:
 - 9spark plug type
Incorrect → Change.

	Spark plug type (manufacturer) CPR8EA-9 (NGK)
--	--



5. Check:
 - 9electrode 1
Damage/wear → Replace the spark plug.
 - 9insulator 2
Abnormal color → Replace the spark plug.
Normal color is medium-to-light tan.
6. Clean:
 - 9spark plug
(with a spark plug cleaner or wire brush)
7. Measure:
 - 9spark plug gap a
(with a wire thickness gauge)
Out of specification → Regap.

	Spark plug gap 0.8–0.9 mm (0.031–0.035 in)
--	---

CHECKING THE SPARK PLUG/ MEASURING THE COMPRESSION PRESSURE

CHK	
ADJ	

8. Install:

9spark plug

13 Nm (1.3 m•kg, 9.5 ft•lb)

NOTE:

Before installing the spark plug, clean the spark plug and gasket surface.

9. Connect:

9spark plug cap

10. Install:

9AIS resonator

9center panel (lower)

Refer to "INSTALLING THE CENTER PANELS".

EAS00067

MEASURING THE COMPRESSION PRESSURE

NOTE:

Insufficient compression pressure will result in a loss of performance.

1. Remove:

9side cowling (right)

Refer to "REMOVING THE SIDE COWLING".

2. Measure:

9valve clearance

Out of specification → Adjust

Refer to "ADJUSTING THE VALVE CLEARANCE".

3. Start the engine, warm it up for several minutes, and then turn it off.

4. Disconnect:

9spark plug cap

5. Remove:

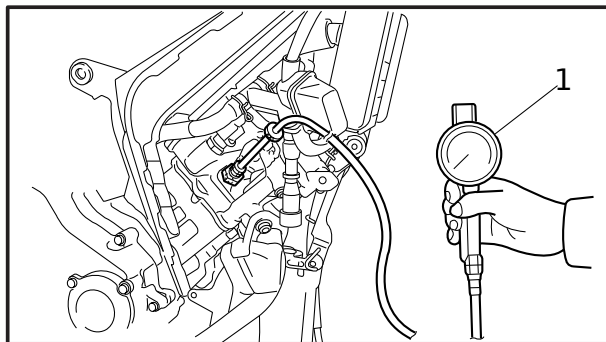
9spark plug

cC

Before removing the spark plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.

MEASURING THE COMPRESSION PRESSURE

CHK
ADJ



6. Install:
9compression gauge 1

Compression gauge
90890-03081

7. Measure:
9compression pressure
Out of specification → Refer to steps (c)
and (d).

Compression pressure
(at sea level)

Minimum

490 kPa (4.9 kg/cm²/70 psi)/at 500 r/min

Standard

560 kPa (5.6 kg/cm²/80 psi)/at 500 r/min

Maximum

630 kPa (6.3 kg/cm²/90 psi)/at 500 r/min

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- Set the main switch to "ON".
- With the throttle wide open and push the "START" switch, then crank the engine until the reading on the compression gauge stabilizes.

W

To prevent sparking, ground the spark plug lead before cranking the engine.

- If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces, and piston crown for carbon deposits.
Carbon deposits → Eliminate.
- If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage →→ Repair.
Same as without oil	Piston, valves, cylinder head gasket or piston possibly defective → Repair.

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MEASURING THE COMPRESSION PRESSURE/ CHECKING THE ENGINE OILLEVEL

CHK
ADJ

8. Install:
 9spark plug

13 Nm (1.3 m•kg, 9.5 ft•lb)

9. Connect:
 9spark plug cap
10. Install:
 9side cowling (right)
 Refer to "INSTALLING THE SIDE COWL-
 INGS".

EAS00070

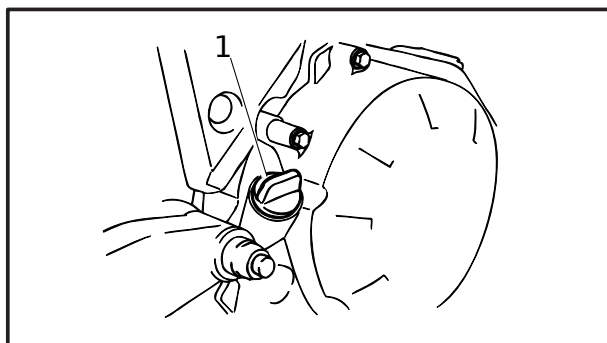
CHECKING THE ENGINE OILLEVEL

1. Stand the vehicle on a level surface.

NOTE:

Make sure the vehicle is upright.

2. Start the engine, warm it up for several min-
utes, and then turn it off.



3. Remove:
 9oil level plug 1

4. Check:
 9engine oil level

The engine oil level should be between the
minimum level mark a and maximum level
mark b .

Below the minimum level mark → Add the
recommended engine oil to the proper level.

Recommended oil

**SAE 20W40 type SF or SAE 20W50
motor oil**

cC

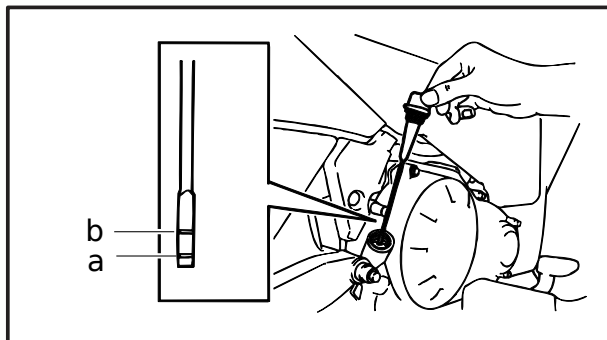
**Do not allow foreign materials to enter the
crankcase.**

NOTE:

9Insert the oil level plug back into the oil filler
hole (without screwing it in), and then remove
it again to check the oil level.

9Before checking the engine oil level, wait a few
minutes until the oil has settled.

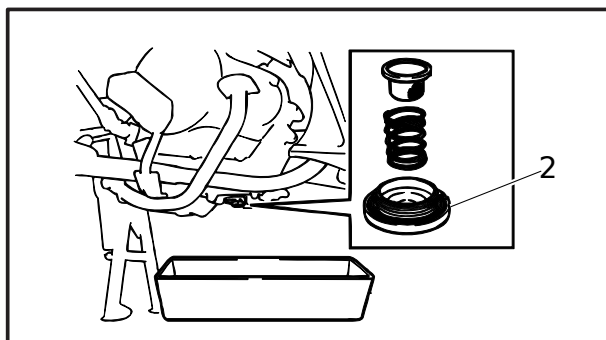
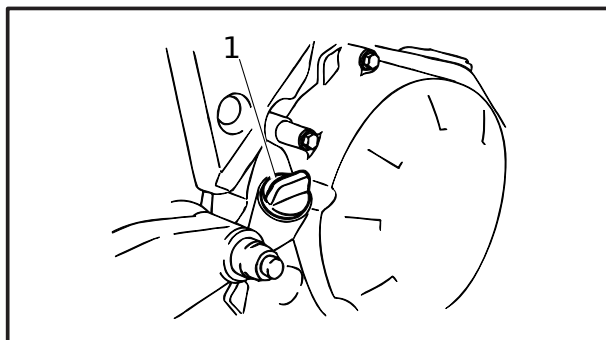
5. Start the engine, warm it up for several min-
utes, and then turn it off.
6. Check the engine oil level again.



EAS00075

CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.



3. Remove:
 - 9oil level plug 1
 - 9engine oil drain plug 2 (with O-ring)
 - 9spring
 - 9oil strainer
4. Drain:
 - 9engine oil (completely from the crankcase)
5. Check:
 - 9oil strainer
 - Clog → Clean.
 - Damage → Replace.
6. Install:
 - 9oil strainer
 - 9spring
 - 9O-ring
 - 9engine oil drain plug

32 Nm (3.2 m•kg, 23 ft•lb)

7. Fill:
 - 9crankcase (with the specified amount of the recommended engine oil)

Quantity

Total amount

1.15 L(1.22 US qt, 1.01 Imp qt)

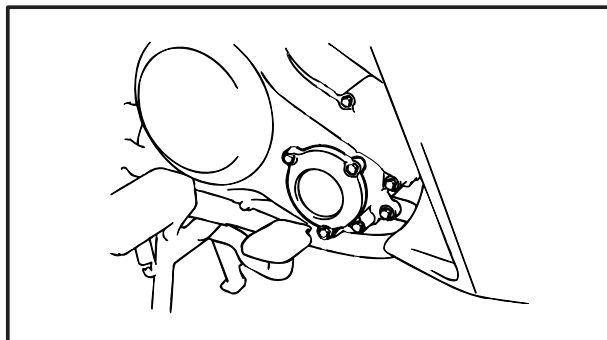
Periodic oil change amount

0.8 L(0.85 US qt, 0.70 Imp qt)

8. Install:
 - 9oil level plug
9. Start the engine, warm it up for several minutes, and then turn it off.
10. Check:
 - 9engine (for engine oil leaks)
11. Check:
 - 9engine oil level
 - Refer to "CHECKING THE ENGINE OIL LEVEL".

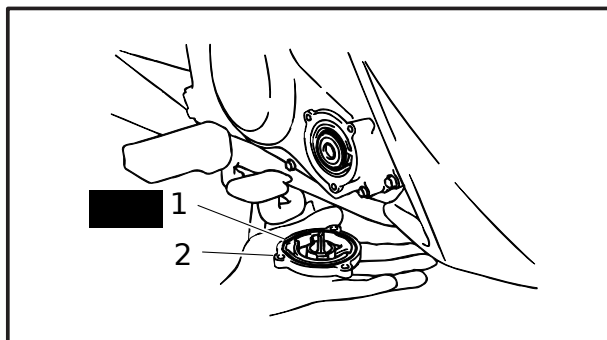
CHANGING THE ENGINE OIL/ CHECKING THE EXHAUST SYSTEM

CHK	
ADJ	



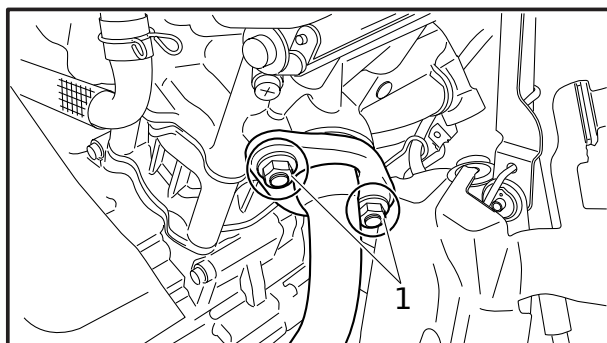
CHECKING THE OILFILTER

1. Remove:
 - 9oil filter element cover
 - 9O-ring
 - 9oil filter element
2. Check:
 - 9oil filter element
 - Dirt or clog → Replace.



3. Install:
 - 9oil filter element
 - 9O-ring 1
 - 9oil filter element cover

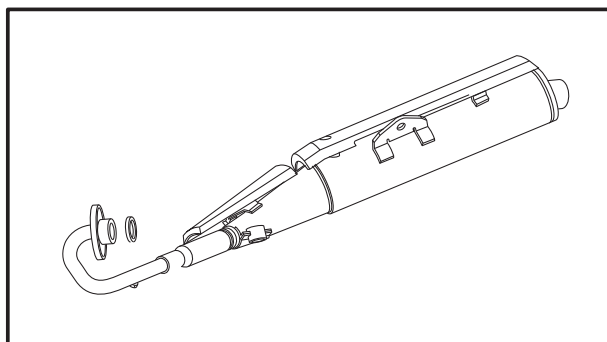
10 Nm (1.0 m•kg, 7.2 ft•lb)



CHECKING THE EXHAUST SYSTEM

1. Check:
 - 9exhaust pipe nuts 1
 - Loose/damage → Tighten/replace.
- 9exhaust pipe gasket
- Exhaust gas leaks → Tighten/replace.

15 Nm (1.5 m•kg, 11 ft•lb)



EAS00086

CLEANING THE AIR FILTER ELEMENT

1. Remove:

9center panel (lower)

Refer to "REMOVING THE CENTER PANELS".

2. Remove:

9air filter case cover 1

9air filter element 2

3. Clean:

9air filter elements

Apply compressed air to the outer surface of the air filter element.

4. Check:

9air filter element

Damage → Replace.

5. Install:

9air filter element

9air filter case cover

9breather hose

C

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect the carburetor tuning, leading to poor engine performance.

NOTE:

When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.

6. Install:
 - 9center panel (lower)
 Refer to "INSTALLING THE CENTERPANELS".

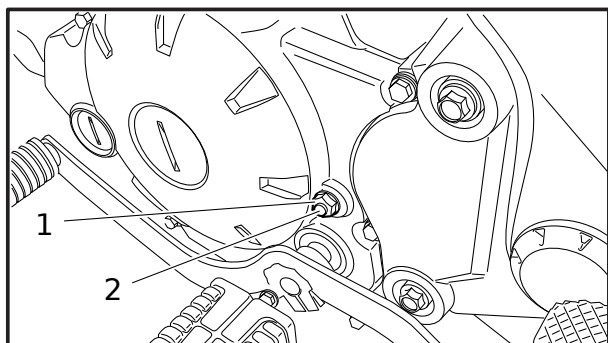
EAS00086

ADJUSTING THE CLUTCH RELEASE SYSTEM

1. Adjust:
 - 9clutch release system

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- a. Loosen the locknut 1 .
- b. Turn the adjusting screw 2 in completely, then turn the adjusting screw out the specified number of turns.



Adjusting screw: 1/8 turns out

- c. Tighten the locknut.

8 Nm (0.8 m•kg, 6.0 ft•lb)

NOTE:

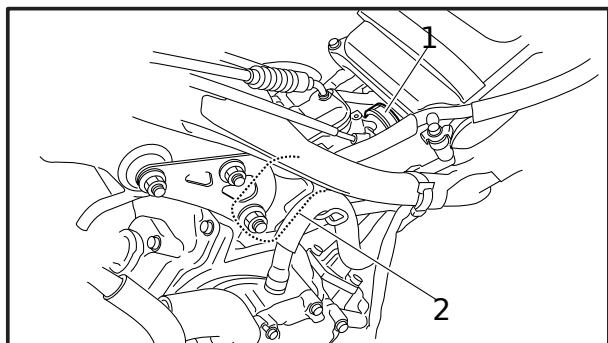
Hold the adjusting screw and tighten the locknut.

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EAS00094

CHECKING THE CARBURETOR JOINT AND INTAKE MANIFOLD

1. Remove:
 - 9side cowlings (left and right)
 - 9center panels (upper and lower)
 - 9front cowlings
 - 9rear cowlings (left and right)
 - 9inner panel
 Refer to "COVERS".



2. Check:
 - 9carburetor joint 1
 - 9intake manifold 2
 Cracks/damage → Replace.
Refer to "CARBURETOR" in chapter 6.

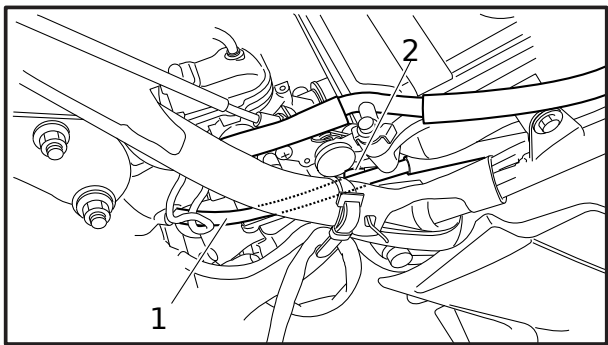
3. Install:
 - 9inner panel
 - 9rear cowlings (left and right)
 - 9front cowling
 - 9center panels (upper and lower)
 - 9side cowlings (left and right)Refer to "COVERS".

EAS00096

CHECKING THE FUEL AND VACUUM HOSES

The following procedure applies to all of the fuel and vacuum hoses.

1. Remove:
 - 9side cowlings (left and right)
 - 9center panels (upper and lower)
 - 9front cowling
 - 9rear cowlings (left and right)
 - 9inner panelRefer to "COVERS".
2. Check:
 - 9fuel cock vacuum hose 1
 - 9fuel hose 2Cracks/damage → Replace.
Loose connection → Connect properly.
3. Install:
 - 9inner panel
 - 9rear cowlings (left and right)
 - 9front cowling
 - 9center panels (upper and lower)
 - 9side cowlings (left and right)Refer to "COVERS".



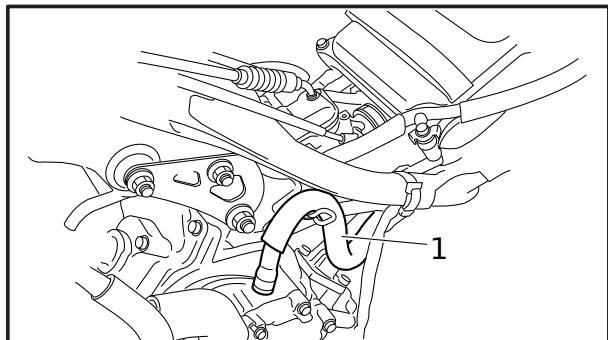
CHECKING THE CRANKCASE BREATHER PIPE/ CHECKING THE COOLANT LEVEL

CHK	
ADJ	

EAS00098

CHECKING THE CRANKCASE BREATHER PIPE

1. Remove:
 - 9side cowlings (left and right)
 - 9center panels (upper and lower)
 - 9front cowling
 - 9rear cowlings (left and right)
 - 9inner panelRefer to "COVERS".
2. Check:
 - 9crankcase breather pipe 1
 - Cracks/damage → Replace.
 - Loose connection → Connect properly.



cC

**Make sure the crankcase breather pipe is
routed correctly.**

3. Install:
 - 9inner panel
 - 9rear cowlings (left and right)
 - 9front cowling
 - 9center panels (upper and lower)
 - 9side cowlings (left and right)Refer to "COVERS".

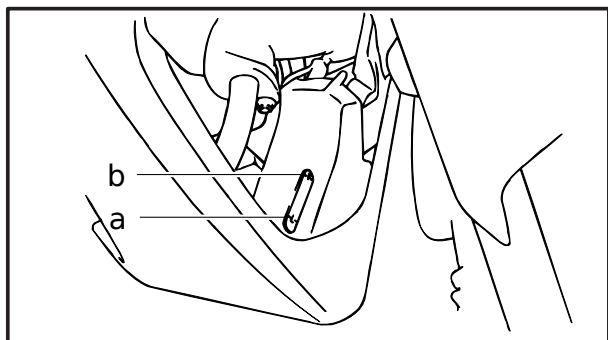
EAS00103

CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

NOTE:

Make sure the vehicle is upright.



2. Check:
 - 9coolant levelThe coolant level should be between the minimum level mark a and maximum level mark b .
Below the minimum level mark → Add the recommended coolant to the proper level.

cC

9A Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.

9B Use only distilled water. However, if distilled water is not available, soft water may be used.

3. Start the engine, warm it up for several minutes, and then turn it off.

4. Check:

9coolant level

NOTE:

Before checking the coolant level, wait a few minutes until it settles.

EAS00104

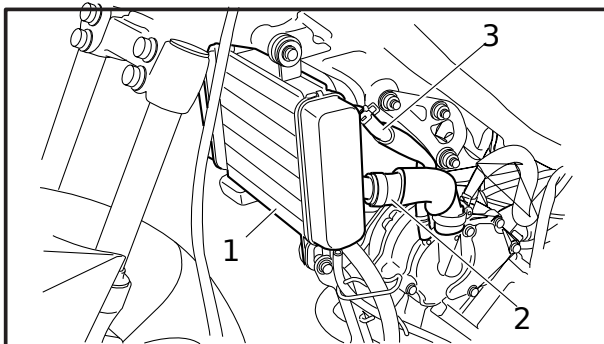
CHECKING THE COOLING SYSTEM

1. Remove:

9side cowlings (left and right)

9front cowling

Refer to "REMOVING THE SIDE COWLINGS" and "REMOVING THE FRONT COWLING".



2. Check:

9radiator 1

9water pump inlet hose 2

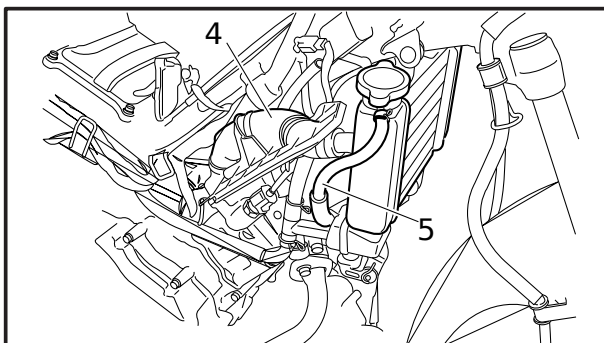
9radiator outlet hose 3

9radiator inlet hose 4

9thermostat outlet hose 5

Cracks/damage → Replace.

Refer to "COOLING SYSTEM" in chapter 5.



3. Install:

9front cowling

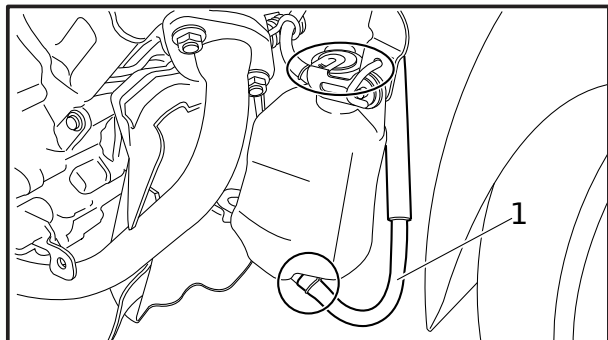
9side cowlings (left and right)

Refer to "REMOVING THE FRONT COWLING" and "REMOVING THE SIDE COWLINGS".

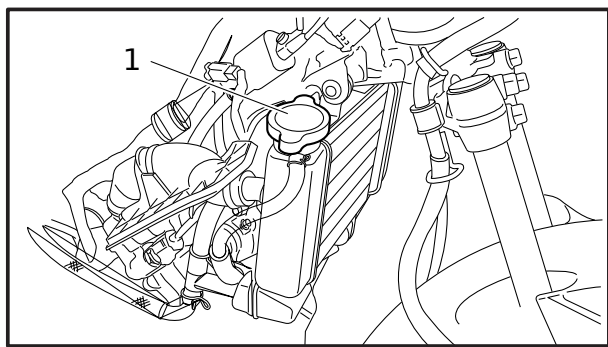
EAS00105

CHANGING THE COOLANT

1. Remove:
 - 9side cowlings (left and right)
 - 9front cowling
 Refer to "REMOVING THE SIDE COWLINGS" and "REMOVING THE FRONT COWLING".



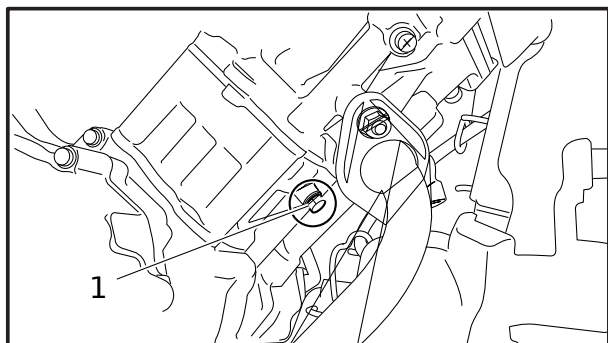
2. Remove:
 - 9coolant reservoir tank cover
 - 9coolant reservoir cap
3. Disconnect:
 - 9coolant reservoir hose 1
4. Drain:
 - 9coolant (from the coolant reservoir)



5. Remove:
 - 9radiator cap 1

W

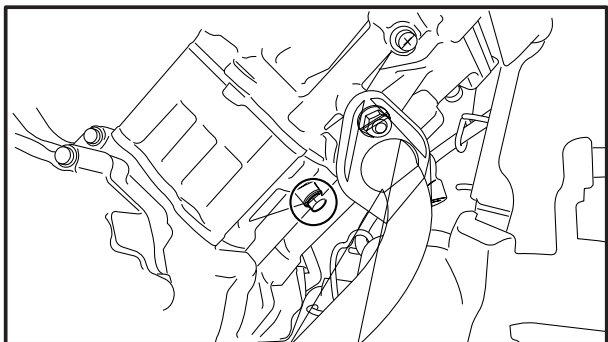
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counter-clockwise toward the detent to allow any residual pressure to escape.
When the hissing sound has stopped, press down on the radiator cap and turn it counter-clockwise to remove.



6. Remove:
 - 9coolant drain bolt 1 (along with the copper washer)
7. Drain:
 - 9coolant (from the engine and radiator)

CHANGING THE COOLANT

CHK
ADJ



8. Install:

9copper washer

9coolant drain bolt

7 Nm (0.7 m•kg, 5.0 ft•lb)

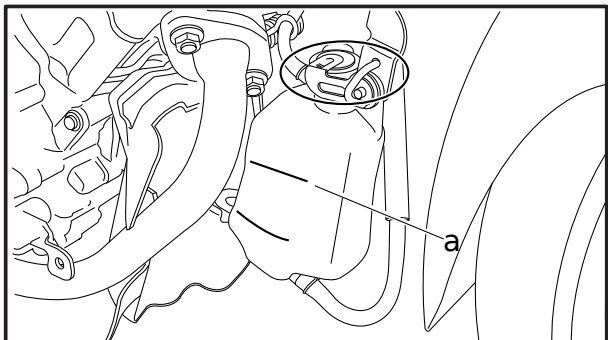
9. Connect:

9coolant reservoir hose

10. Fill:

9cooling system

(with the specified amount of the recommended coolant)



Recommended antifreeze
YAMAHA GENUINE COOLANT
High-quality ethylene glycol
antifreeze containing corrosion
inhibitors for aluminum engines

Mixing ratio

1:1 (antifreeze:water)

Quantity

Radiator capacity

0.62 L (0.55 Imp qt, 0.66 US qt)

Coolant reservoir capacity

0.28 L (0.25 Imp qt, 0.30 US qt)

Up to the maximum level mark a

NOTE:

The specified amount of coolant is a standard amount. Fill the cooling system with coolant until coolant comes out of the air bleed bolt hole.

Handling notes for coolant

Coolant is potentially harmful and should be handled with special care.

W

9 If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.

9 If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.

9 If coolant is swallowed, induce vomiting and get immediate medical attention.

cC

9A Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.

9U Use only distilled water. However, if distilled water is not available, soft water may be used.

9P If coolant comes into contact with painted surfaces, immediately wash them with water.

9D Do not mix different types of antifreeze.

11. Install:

9 radiator cap

9 coolant reservoir cap

9 coolant reservoir tank cover

12. Start the engine, warm it up for several minutes, and then stop it.

13. Check:

9 coolant level

Refer to "CHECKING THE COOLANT LEVEL".

NOTE:

Before checking the coolant level, wait a few minutes until the coolant has settled.

14. Install:

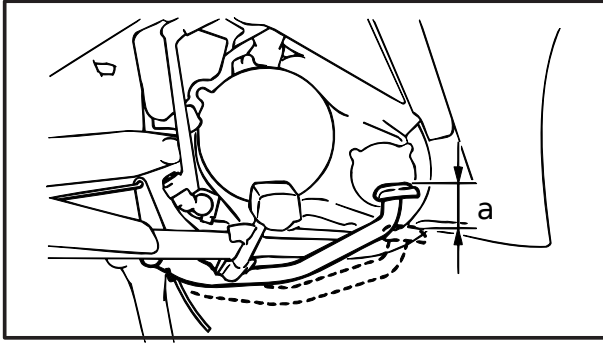
9 front cowling

9 side cowlings (left and right)

Refer to "REMOVING THE FRONT COWLING" and "REMOVING THE SIDE COWLINGS".

ADJUSTING THE REAR BRAKE

CHK
ADJ



CHASSIS

EAS00113

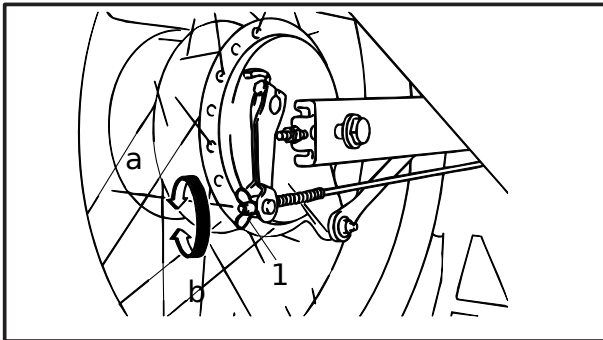
ADJUSTING THE REAR BRAKE

1. Check:

9brake pedal free play a

Out of specification → Adjust.

**Brake pedal free play (at the end
of the brake pedal)**
25–35 mm (0.98–1.38 in)



2. Adjust:

9brake pedal free play

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- a. Turn the adjuster 1 in direction a or b until the specified brake pedal free play is obtained.

Direction aa	Brake pedal free play is increased.
Direction bb	Brake pedal free play is decreased.

cC

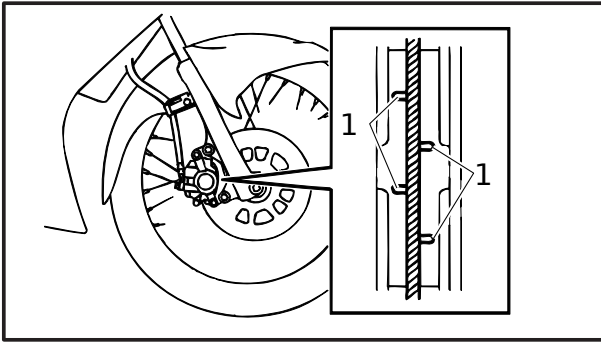
**After adjusting the brake pedal free play,
make sure there is no brake drag.**

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3. Adjust:

9rear brake light switch

Refer to “ADJUSTING THE REAR BRAKE
LIGHTSWITCH”.



EAS00120

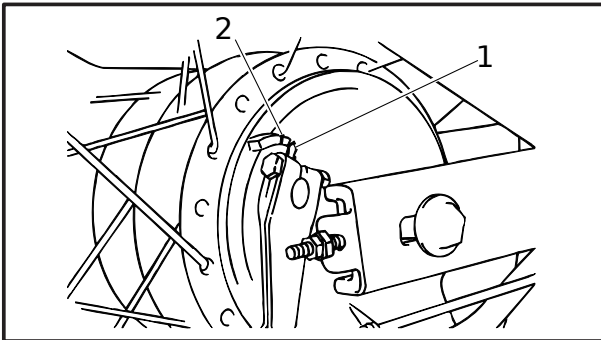
CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:

9front brake pad

Wear indicator groove 1 almost disappeared → Replace the brake pads as a set.
Refer to "REPLACING THE FRONT BRAKE PADS" in chapter 7.



EAS00126

CHECKING THE REAR BRAKE SHOES

1. Operate the brake.
2. Check:

9wear indicator 1

Reaches the wear limit line 2 → Replace the brake shoes as a set.

Refer to "REAR WHEEL AND BRAKE" in chapter 7.

EAS00128

ADJUSTING THE REAR BRAKE LIGHT SWITCH

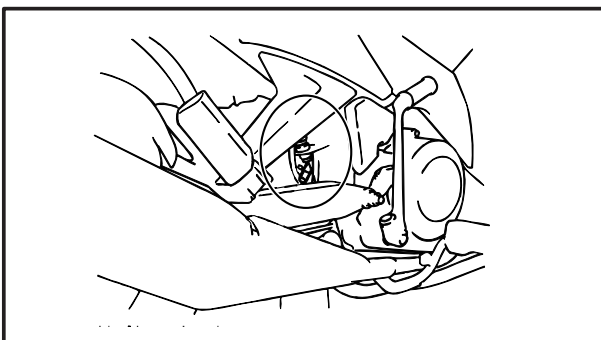
NOTE:

The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.

1. Check:

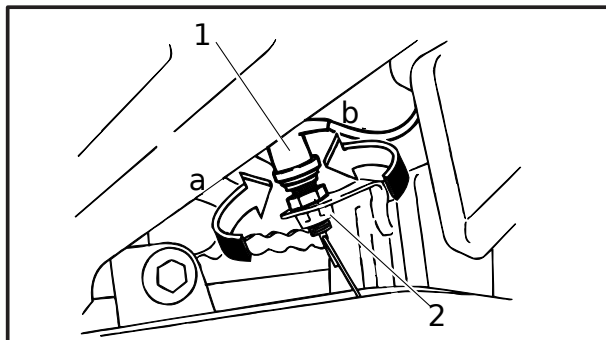
9rear brake light operation timing

Incorrect → Adjust.



ADJUSTING THE REAR BRAKE LIGHT SWITCH/ CHECKING THE FRONT BRAKE HOSE

CHK
ADJ



2. Adjust:

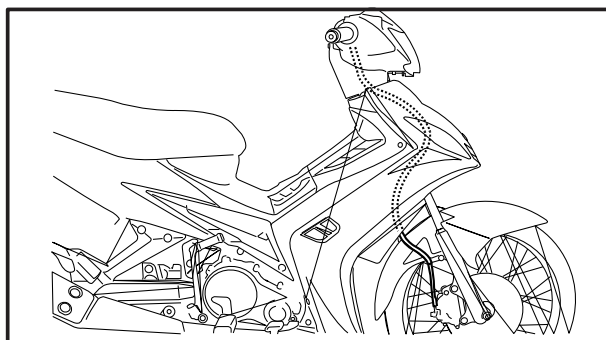
9rear brake light operation timing

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- a. Hold the main body 1 of the rear brake light switch so that it does not rotate and turn the adjusting nut 2 in direction a or b until the rear brake light comes on at the proper time.

Direction aa	Brake light comes on sooner.
Direction bb	Brake light comes on later.

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EAS00129

CHECKING THE FRONT BRAKE HOSE

1. Check:

9brake hose

Cracks/damage/wear → Replace.

2. Check:

9brake hose clamp

Loose Connection → Tighten the clamp bolt.

3. Hold the vehicle upright and apply the front brake several times.

4. Check:

9brake hose

Brake fluid leakage → Replace the damaged hose.

Refer to "FRONTBRAKE" in chapter 7.

EAS00133

BLEEDING THE HYDRAULIC BRAKE SYSTEM

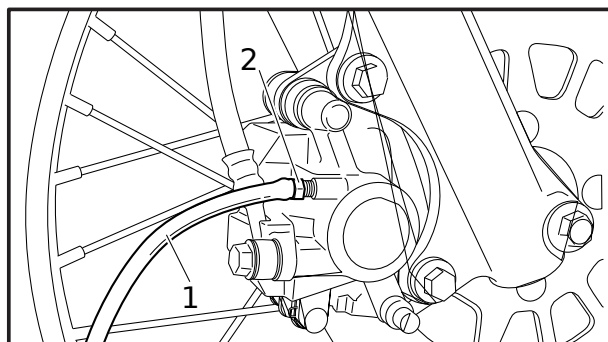
W

Bleed the hydraulic brake system whenever:

- 99 the system is disassembled.
- 99 a brake hose is loosened, disconnected or replaced.
- 99 the brake fluid level is very low.
- 99 brake operation is faulty.

NOTE:

- 99 Be careful not to spill any brake fluid or allow the brake master cylinder reservoir to overflow.
- 99 When bleeding the hydraulic brake system, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic brake system, considerably lengthening the bleeding procedure.
- 99 If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.



1. Bleed:

99 hydraulic brake system

★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

- a. Fill the brake master cylinder reservoir to the proper level with the recommended brake fluid.
- b. Install the brake master cylinder reservoir diaphragm.
- c. Connect a clear plastic hose 1 tightly to the bleed screw 2 .
- d. Place the other end of the hose into a container.
- e. Slowly apply the brake lever several times.
- f. Fully pull the brake lever without releasing it.
- g. Loosen the bleed screw.

NOTE:

Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip.

- h. Tighten the bleed screw and then release the brake lever.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Tighten the bleed screw to specification.

Bleed screw

6 Nm (0.6 m·kg, 4.3 ft·lb)

- k. Fill the brake master cylinder reservoir to the proper level with the recommended brake fluid.

Refer to "CHECKING THE BRAKE FLUID LEVEL".

W

After bleeding the hydraulic brake system, check the brake operation.

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EAS00140

ADJUSTING THE DRIVE CHAIN SLACK

NOTE:

The drive chain slack must be checked at the tightest point on the chain.

cC

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

ADJUSTING THE DRIVE CHAIN SLACK

CHK
ADJ

1. Stand the vehicle on a level surface.

W

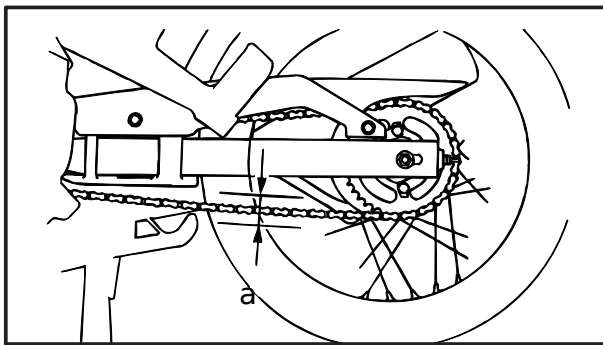
Securely support the vehicle so that there is no danger of it falling over.

NOTE:

Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Spin the rear wheel several times and find the tightest position of the drive chain.
3. Check:
9drive chain slack a
Out of specification → Adjust.

Drive chain slack 25–35 mm (0.93–1.38 in)
--



4. Adjust:

9drive chain slack

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- a. Loosen the wheel axle nut.
- b. Loosen both locknuts 1 .
- c. Turn both adjusting nuts 2 in direction a or b until the specified drive chain slack is obtained.

Direction aa	Drive chain is tightened.
Direction bb	Drive chain is loosened.

NOTE:

To maintain the proper wheel alignment, adjust both sides evenly.

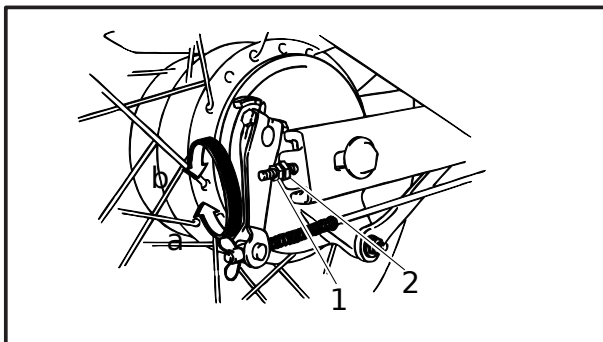
- d. Tighten both locknuts to specification.

Locknut 7 Nm (0.7 m·kg, 5.0 ft·lb)

- e. Tighten the wheel axle nut to specification.

Wheel axle nut 60 Nm (6.0 m·kg, 43 ft·lb)
--

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EAS00143

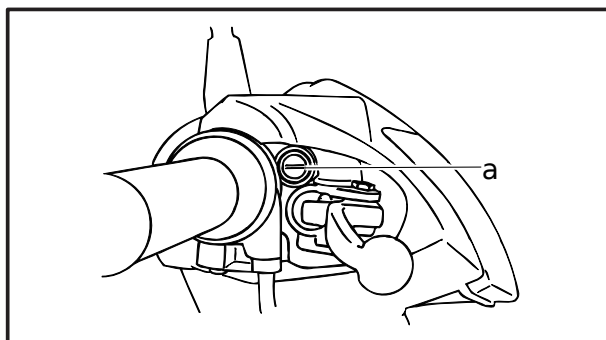
LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the vehicle is used in dusty areas.

Use only kerosene to clean the drive chain.

Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for non-O-ring chains.

	Recommended lubricant
	Engine oil or chain lubricant suitable for non-O-ring chains



EAS00115

CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

NOTE:

Make sure the vehicle is upright.

2. Check:

9 brake fluid level

Below the minimum level mark a → Add the recommended brake fluid to the proper level.

	Recommended brake fluid
	DOT3 or 4

W

9 Use only the designated brake fluid.

Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.

9 Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.

9 When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

cC

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

NOTE:

In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

EASF0010

CHECKING AND ADJUSTING THE STEERING HEAD

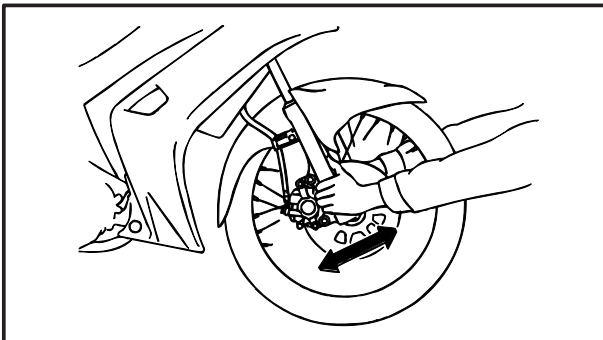
1. Stand the vehicle on a level surface.

W

Securely support the vehicle so that there is no danger of it falling over.

NOTE:

Place the vehicle on a suitable stand so that the front wheel is elevated.



2. Check:

9steering head

Grasp the bottom of the front fork legs and gently rock the front fork.

Binding/looseness → Adjust the steering head.

3. Remove:

9side cowlings (left and right)

9front cowling

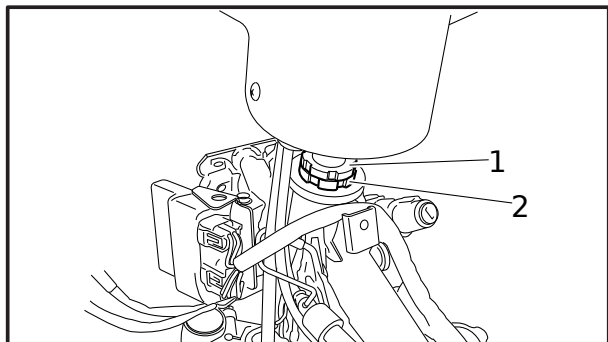
9center panels (upper and lower)

9inner panel

Refer to "COVERS".

CHECKING AND ADJUSTING THE STEERING HEAD

CHK
ADJ



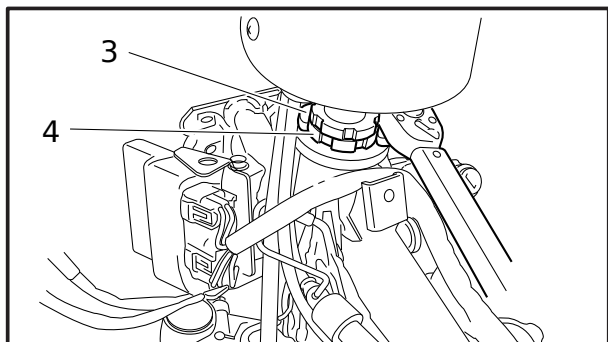
4. Adjust:
9steering head

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- Loosen the upper ring nut 1 .
- Loosen the lower ring nut 2 and then tighten it to specification with a steering nut wrench 3 .

NOTE: _____

Set the torque wrench at a right angle to the steering nut wrench.



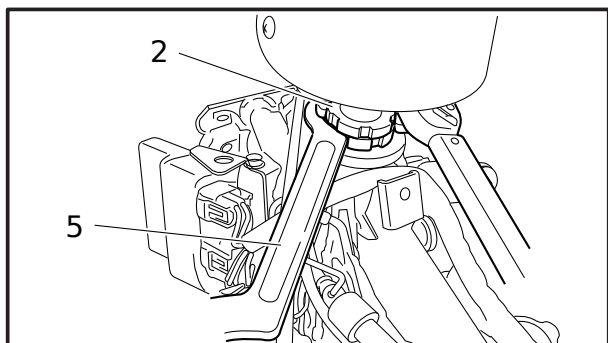
Steering nut wrench
90890-01403

Lower ring nut
30 Nm (3.0 m·kg, 22 ft·lb)

- Loosen the lower ring nut counterclockwise 1/4 of a turn.
- Hold the lower ring nut with a ring nut wrench 4 and tighten the upper ring nut 2 with a steering nut wrench.

W _____

Do not overtighten the lower ring nut.



Ring nut wrench
90890-01268

Upper ring nut
75 Nm (7.5 m·kg, 54 ft·lb)

- Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
Refer to "STEERING HEAD" in chapter 7.
- Slide the rubber cover to its original position.

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5. Install:
- 9front cowlings (left and right)
 - 9center panel
- Refer to "INSTALLING THE FRONTCOWLINGS".

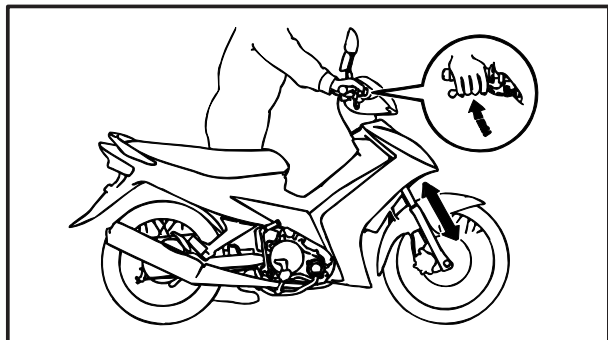
EAS00149

CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

W

Securely support the vehicle so that there is no danger of it falling over.



2. Check:

9inner tube

Damage/scratches → Replace.

9oil seal

Oil leakage → Replace.

3. Hold the vehicle upright and apply the front brake.

4. Check:

9front fork operation

Push down hard on the handlebar several times and check if the front fork rebounds smoothly.

Rough movement → Repair.

Refer to "FRONTFORK" in chapter 7.

CHECKING THE TIRES

CHK
ADJ

EASF0015

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
 - 9tire pressure
 - Out of specification → Regulate.

W

99The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.

99The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.

99Operation of an overloaded vehicle could cause tire damage, an accident or an injury. **NEVER OVERLOAD THE VEHICLE.**

Basic weight (with oil and a full fuel tank)	109 kg (240 lb)	
Maximum load*	110 kg (243 lb)	
Cold tire pressure	Front	Rear
	200 kPa (2.00 kgf/cm ² 29 psi)	225 kPa (2.25 kgf/cm ² 33 psi)

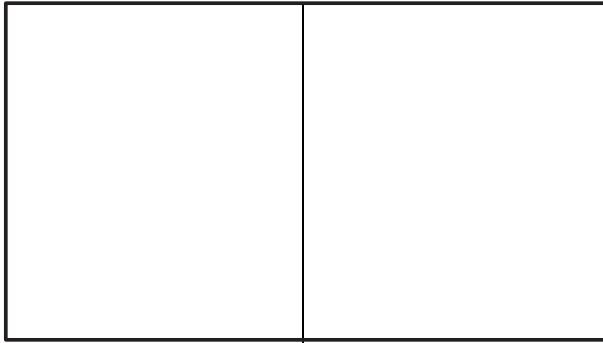
* Total weight of rider, passenger, cargo and accessories

W

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

CHECKING THE TIRES

CHK
ADJ



2. Check:

9 tire surfaces

Damage/wear → Replace the tire.

Minimum tire tread depth
0.8 mm (0.03 in)

- 1 Tire tread depth
- 2 Sidewall
- 3 Wear indicator

W

9 Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.

9 When using tube tires, be sure to install the correct tube.

9 Always replace a new tube tire and a new tube as a set.

9 To avoid pinching the tube, make sure the wheel rim band and tube are centered in the wheel groove.

9 Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

9 After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this vehicle.

CHECKING THE TIRES/ CHECKING AND TIGHTENING THE SPOKES

CHK	
ADJ	

W _____

9 New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

9 After a tire has been repaired or replaced, be sure to tighten the tire air valve stem locknut 11 to specification.

NOTE:

For tires with a direction of rotation mark 1 :

9 Install the tire with the mark pointing in the direction of wheel rotation.

9 Align the mark 2 with the valve installation point.

EAS00169

CHECKING AND TIGHTENING THE SPOKES

The following procedure applies to all of the spokes.

1. Check:

9 spoke 1

Bends/damage → Replace.

Loose → Tighten.

Tap the spokes with a screwdriver.

NOTE:

A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

2. Tighten:

9 spoke

(with a spoke wrench 2)

3 Nm (0.3 m•kg, 2.2 ft•lb)

NOTE:

Be sure to tighten the spokes before and after break-in.

EAS00170

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the inner and outer cables.

W

Damaged outer cable may cause the cable to corrode and interfere with its movement. Replace damaged outer cable and inner cables as soon as possible.

1. Check:
 - 9outer cable
 - Damage → Replace.
2. Check:
 - 9cable operation
 - Rough movement → Lubricate.

	Recommended lubricant
	Engine oil or a suitable cable lubricant

NOTE:

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

EAS00171

LUBRICATING THE LEVER AND PEDALS

Lubricate the pivoting point and metal-to-metal moving parts of the lever and pedals.

	Recommended lubricant
	Lithium-soap-based grease

EAS00172

LUBRICATING THE SIDESTAND

Lubricate the pivoting point and metal-to-metal moving parts of the sidestand.

	Recommended lubricant
	Lithium-soap-based grease

EAS00173

LUBRICATING THE CENTERSTAND

Lubricate the pivoting point and metal-to-metal moving parts of the centerstand.

	Recommended lubricant
	Lithium-soap-based grease

EAS00176

ELECTRICAL SYSTEM CHECKING AND CHARGING THE BATTERY

W

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid.

Therefore, always follow these preventive measures:

- 90 Wear protective eye gear when handling or working near batteries.
- 90 Charge batteries in a well-ventilated area.
- 90 Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).
- 90 DO NOT SMOKE when charging or handling batteries.
- 90 KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.
- 90 Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.

FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

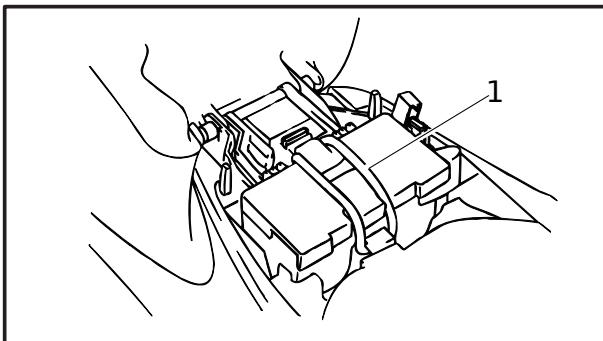
- 90 Skin — Wash with water.
- 90 Eyes — Flush with water for 15 minutes and get immediate medical attention.

INTERNAL

- 90 Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.

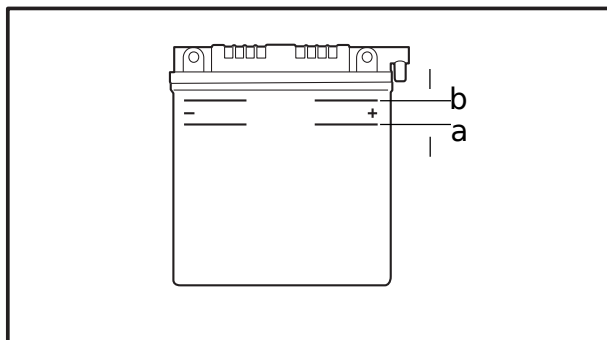
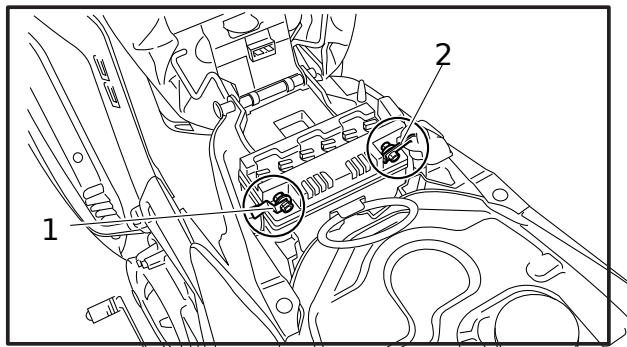
1. Open the seat and battery cover.

2. Remove
90 battery band 1



CHECKING AND CHARGING THE BATTERY

CHK
ADJ



3. Disconnect:
 - 9battery leads
(from the battery terminals)

cC

First, disconnect the negative battery lead 1 , and then the positive battery lead 2 .

4. Disconnect:
 - 9battery breather hose
5. Remove:
 - 9battery
6. Check:
 - 9electrolyte level
The electrolyte level should be between the minimum level mark a and the maximum level mark b .
Below the minimum level mark → Add distilled water to the proper level.

cC

Add only distilled water. Tap water contains minerals which are harmful to the battery.



7. Check:
 - 9specific gravity
Less than 1.280 → Recharge the battery.

	Specific gravity 1.280 at 20 °C (68 °F)
--	--



8. Charge:
 - 9battery

Battery charging amperage and time 0.5 amps/10 hrs

W

Do not quick charge a battery.

cC

- 9Loosen the battery sealing caps.
- 9Make sure the battery breather hose and battery vent are free of obstructions.
- 9To ensure maximum performance, always charge a new battery before using it.
- 9Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- 9If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- 9When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative lead from the battery terminal.)
- 9To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- 9Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- 9Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- 9If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!

NOTE:

Replace the battery whenever:

- 9battery voltage does not rise to specification or bubbles fail to rise during charging,
- 9sulfation of one or more battery cells occurs (as indicated by the battery plates turning white or material accumulating in the bottom of the battery cell),
- 9specific gravity readings after a long, slow charge indicate that the charge of one battery cell is lower than the rest,

9warpage or buckling of the battery plates or insulators is evident.

9. Check:

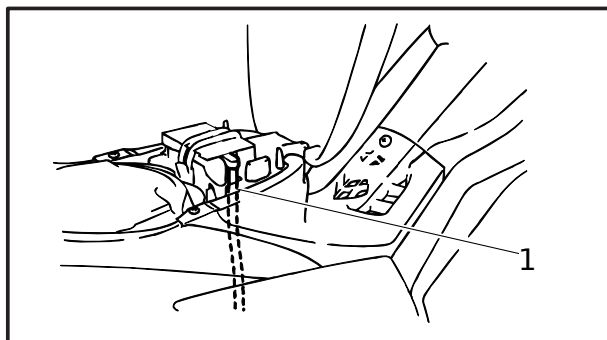
9battery breather hose and battery vent
Obstruction → Clean.
Damage → Replace.

10. Install:

9battery

11. Connect:

9battery breather hose 1



cC

9When checking the battery, make sure the battery breather hose is properly installed and routed correctly. If the battery breather hose is positioned so as to allow electrolyte or hydrogen gas from the battery to contact the frame, the vehicle and its finish may be damaged.

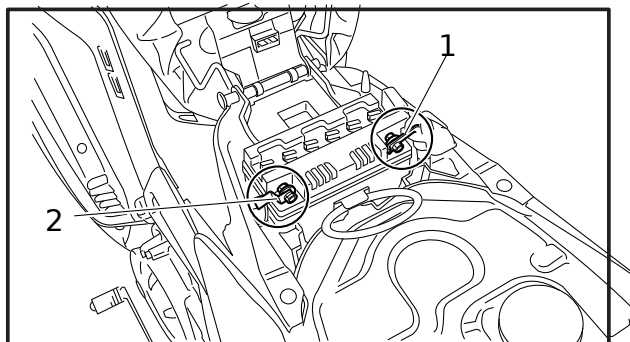
9Make sure the battery breather hose is properly routed away from the drive chain and from below the swingarm.

12. Check:

9battery terminals
Dirt → Clean with a wire brush.
Loose connection → Connect properly.

13. Connect:

9battery leads
(to the battery terminals)



cC

First, connect the positive battery lead 1 , and then the negative battery lead 2 .

14. Lubricate:

9battery terminals

	Recommended lubricant Dielectric grease
--	--

15. Install:

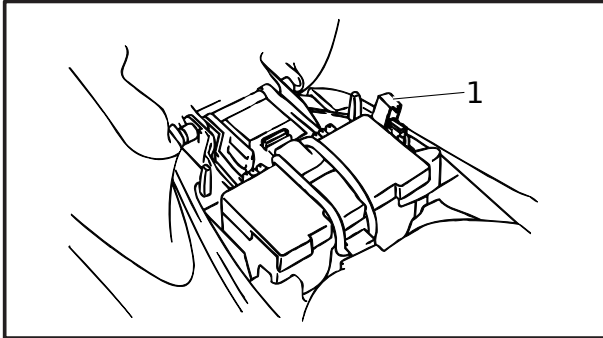
9battery band

EASF0017

CHECKING THE FUSE

cC

To avoid a short circuit, always set the main switch to “OFF” when checking or replacing a fuse.



1. Open the seat and battery cover.

2. Remove:

9fuse holder 1

3. Check:

9fuse

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

a. Connect the pocket tester to the fuse and check the continuity.

NOTE:

Set the pocket tester selector to “Ω· 1”.

Pocket tester 90890-03112

b. If the pocket tester indicates “ ∞”, replace the fuse.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

4. Replace:

9blown fuse

W

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

5. Install:

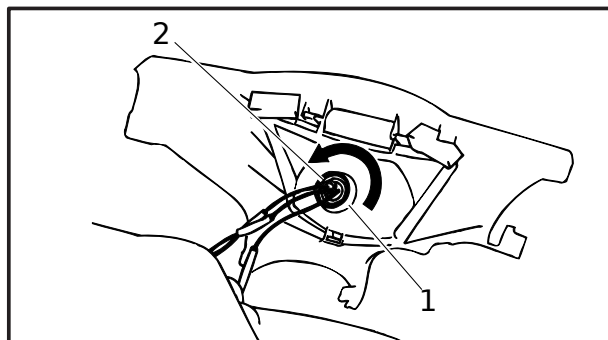
9fuse holder

EAS00183

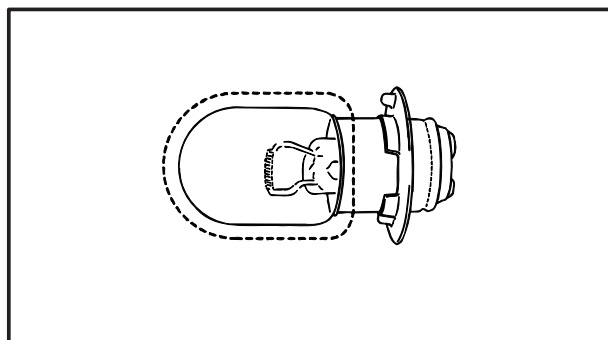
REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

1. Remove:
 - 9headlight assembly
 - Refer to "REMOVING THE HEADLIGHT ASSEMBLY".



2. Remove:
 - 9headlight bulb holder 1



3. Remove:
 - 9headlight bulb

W

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

4. Install:
 - 9headlight bulb
 - Secure the new headlight bulb with the headlight bulb holder.

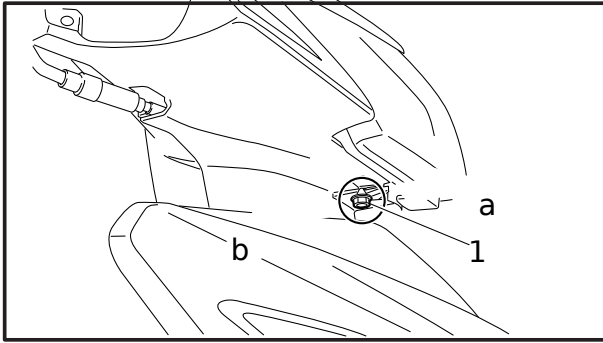
cC

Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

5. Install:
 - 9headlight bulb holder
6. Install:
 - 9headlight bulb cover
 - 9headlight assembly
 - Refer to "INSTALLING THE HEADLIGHT ASSEMBLY".

ADJUSTING THE HEADLIGHT BEAM

CHK
ADJ



EAS00186

ADJUSTING THE HEADLIGHT BEAM

1. Adjust:

9headlight beam (vertically)

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- Loosen the bolt 1 .
- Slide the bottom of the headlight unit forward a or backward b .

Slide forward a	Headlight beam is raised.
Slide backward b	Headlight beam is lowered.

c. Tighten the bolt 1 .

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

CHAPTER 4 ENGINE

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ENG

ENGINE REMOVING THE ENGINE

NOTE:

It is not necessary to remove the engine in order to remove the following components.

9Cylinder head

9Cylinder

9Piston

9Clutch

9Shift shaft

9Oil pump

9Generator

9Starter clutch

1. Remove:

9side cowlings (left and right)

9front cowling

9center panels (upper and lower)

9rear cowlings (left and right)

Refer to "COVERS" in chapter 3.

9drive sprocket

Refer to "DRIVE CHAIN AND SPROCKETS" in chapter 7.

COOLING SYSTEM

1. Drain:

9coolant

(completely from the water jacket)

Refer to "CHANGING THE COOLANT" in chapter 3.

2. Remove:

9radiator assembly

9water pump assembly

Refer to "RADIATOR" and "WATER PUMP" in chapter 5.

ENGINE OIL

1. Drain:

9engine oil

(completely from the crankcase)

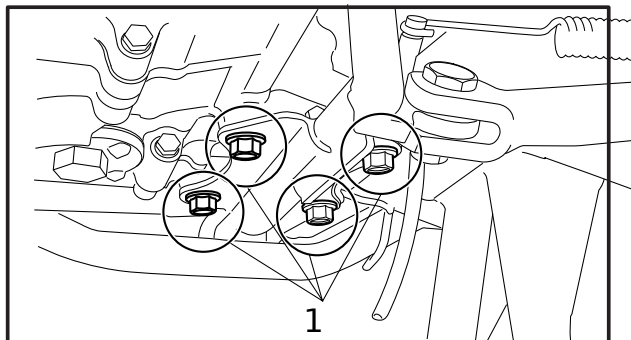
Refer to "CHANGING THE ENGINE OIL" in chapter 3.

CARBURETOR

1. Remove:

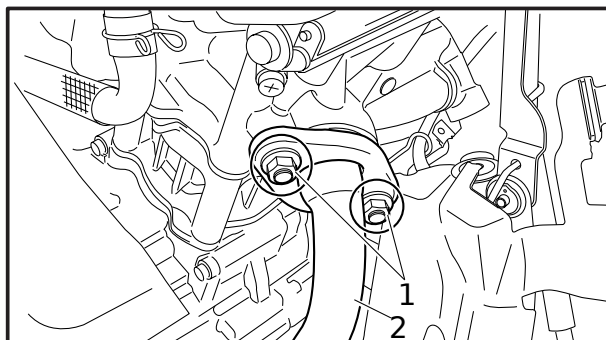
9carburetor assembly

Refer to "CARBURETOR" in chapter 6.



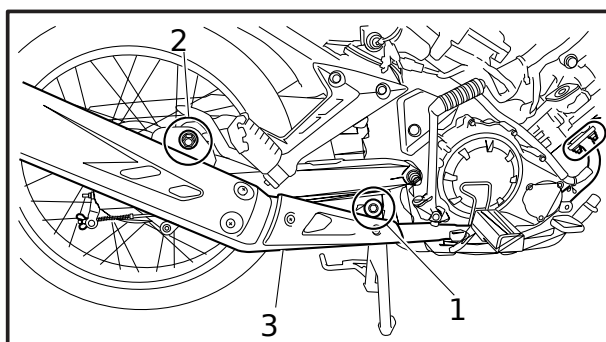
FOOTREST

1. Remove:
9footrest bolts 1
9footrest



MUFFLER

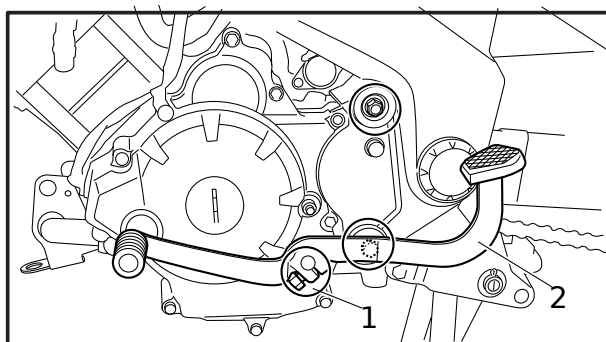
1. Remove:
9exhaust pipe nuts 1
9exhaust pipe 2



2. Remove:
9lower muffler bolt 1
9washer
9upper muffler bolt 2
9washers
9nut
9muffler 3

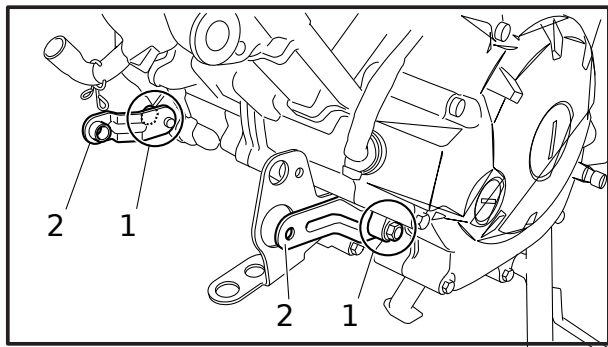
BRAKE PEDAL

1. Remove:
9rear brake light switch spring
9brake pedal spring
9cotter pin
9brake pedal



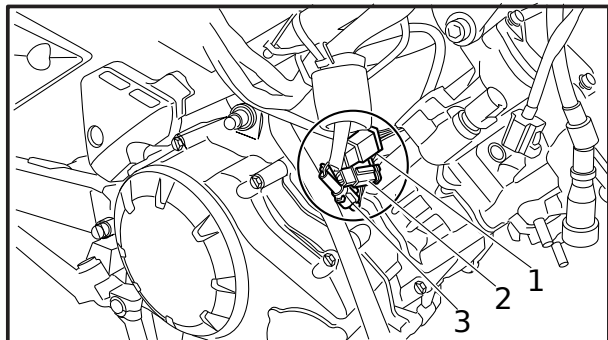
SHIFT PEDAL

1. Remove:
9shift pedal bolt 1
9shift pedal 2
9sprocket cover



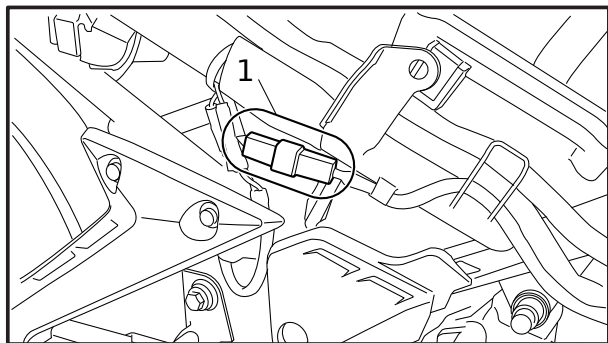
SIDE COWLING BRACKET

1. remove:
 - 9side cowling bracket bolts 1
 - 9side cowling bracket 2



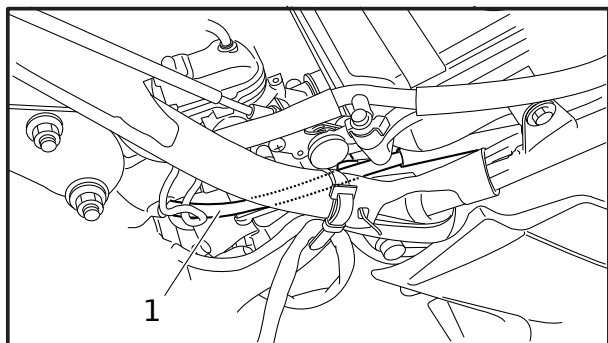
WIRE, CABLE AND HOSE

1. Disconnect:
 - 9neutral switch lead coupler 1
 - 9stator coil lead coupler 2
 - 9pick up coil lead coupler 3
 - 9crankcase breather pipe 4

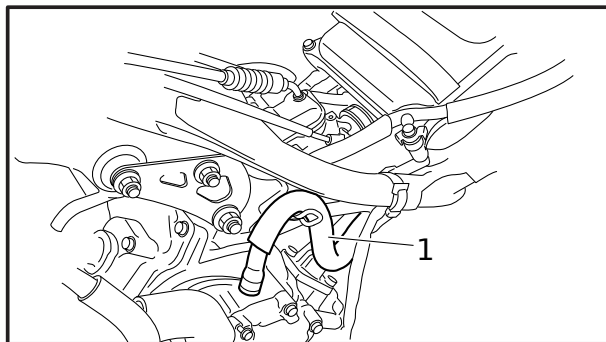


2. Remove:
 - 9starter motor lead coupler (T135SE)

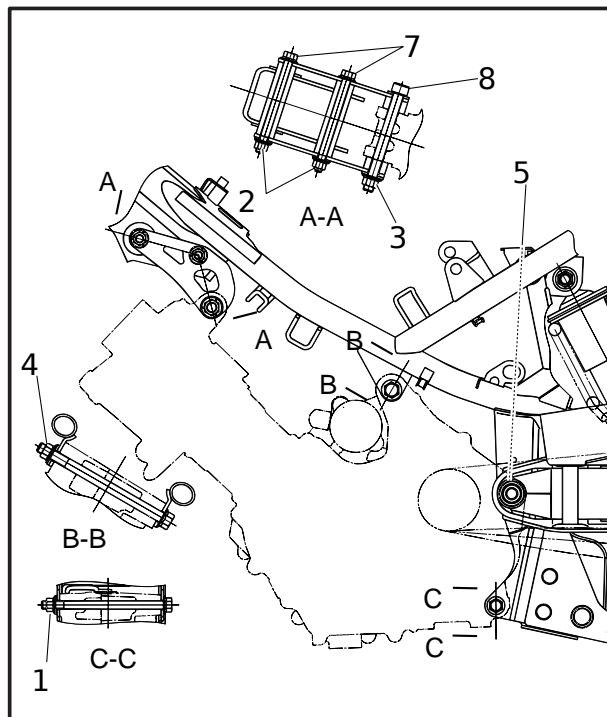
3. Remove:
 - 9spark plug cap



4. Remove:
 - 9fuel cock vacuum hose 1

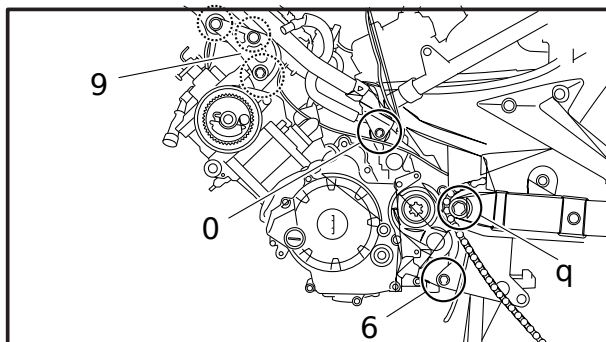


5. Remove:
 - 9crankcase breather pipe 1



ENGINE ASSEMBLY

1. Loosen:
 - 9rear lower mounting nut 1
 - 9plate nuts (front and rear) 2
 - 9front mounting nut 3
 - 9rear upper mounting nut 4
 - 9pivot shaft nut 5
2. Remove:
 - 9rear lower mounting nut 1
 - 9washer
 - 9rear lower mounting bolt 6
 - 9plate nuts (front and rear) 2
 - 9washers (front and rear)
 - 9plate bolts (front and rear) 7
 - 9front mounting nut 3
 - 9washer
 - 9front mounting bolt 8
 - 9plate (left and right) 9
 - 9rear upper mounting nut 4
 - 9washer
 - 9rear upper mounting bolt 0
 - 9pivot shaft nut 3
 - 9washer
 - 9pivot shaft q
 - 9engine assembly



W

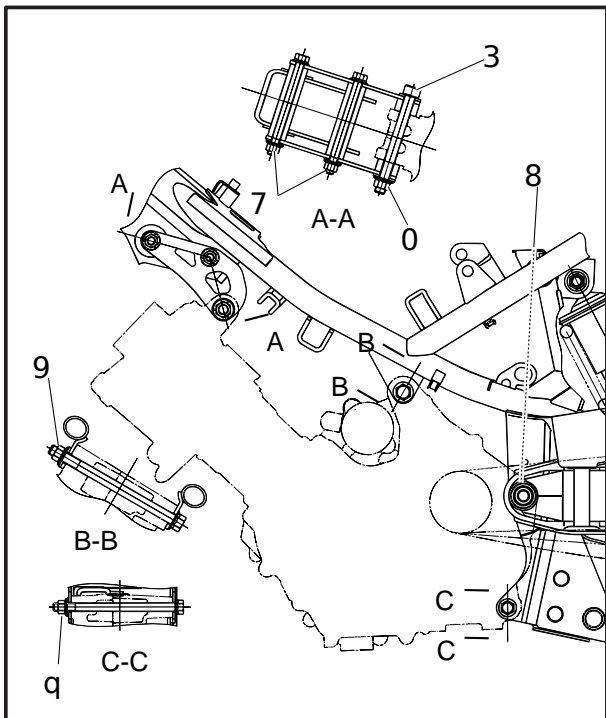
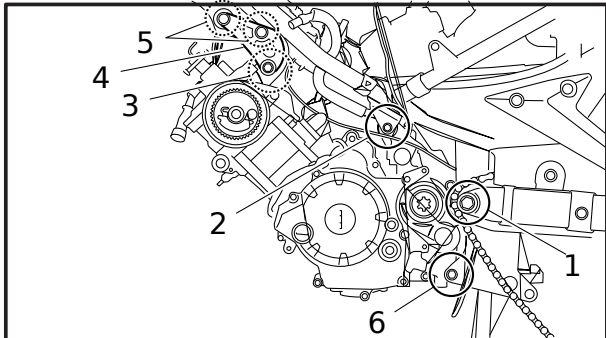
Securely support the vehicle so there is no danger of it falling over.

EASF0019

INSTALLING THE ENGINE ENGINE ASSEMBLY

W

Securely support the vehicle so there is no danger of it falling over when installing engine.



1. Install:

- 9engine assembly
- 9pivot shaft 1
- 9washer
- 9pivot shaft nut
- 9rear upper mounting bolt 2
- 9washer
- 9rear upper mounting nut
- 9front mounting bolt 3
- 9washer
- 9front mounting nut
- 9plate (left and right) 4
- 9plate bolts (front and rear) 5
- 9washers (front and rear)
- 9plate nuts (front and rear)
- 9rear lower mounting bolt 6
- 9washer
- 9rear lower mounting nut

2. Temporary tighten:

- 9plate nuts (front and rear) 7

10 Nm (1.0 m·kg, 7.2 ft·lb)

3. Tighten:

- 9pivot shaft nut 8

66 Nm (6.6 m·kg, 48 ft·lb)

- 9rear upper mounting nut 9

72 Nm (7.2 m·kg, 52 ft·lb)

- 9front mounting nut 0

72 Nm (7.2 m·kg, 52 ft·lb)

- 9plate nuts (front and rear) 7

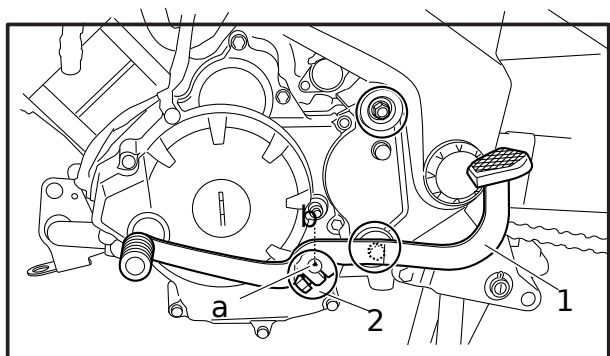
34 Nm (3.4 m·kg, 25 ft·lb)

- 9rear lower mounting nut q

34 Nm (3.4 m·kg, 25 ft·lb)

WIRE, CABLE AND HOSE

1. Connect:
 - 9starter motor lead coupler (T135SE)
 - 9neutral switch lead coupler
 - 9pickup coil lead coupler
 - 9stator coil lead coupler
2. Install:
 - 9crankcase breather pipe
 - 9fuel cock vacuum hose
 - 9spark plug cap



SIDECOWLINGBRACKET

1. Install:
 - 9side cowling bracket
 - 9side cowling bracket bolts

7 Nm (0.7 m•kg, 5.0 ft•lb)

SHIFT PEDAL

1. Install:
 - 9sprocket cover
 - 9shift pedal 1
 - 9shift pedal bolt 2

10 Nm (1.0 m•kg, 7.2 ft•lb)

18 Nm (1.8 m•kg, 13 ft•lb)

NOTE:

Align the punch mark **a** in the shift pedal with the punch mark **b** in the shift shaft.

BRAKE PEDAL

1. Install:
 - 9brake pedal
 - 9circlip
 - 9brake pedal spring
 - 9rear brake light switch spring

MUFFLER

1. Install:
 - 9muffler
 - 9washers
 - 9nut
 - 9upper muffler bolt

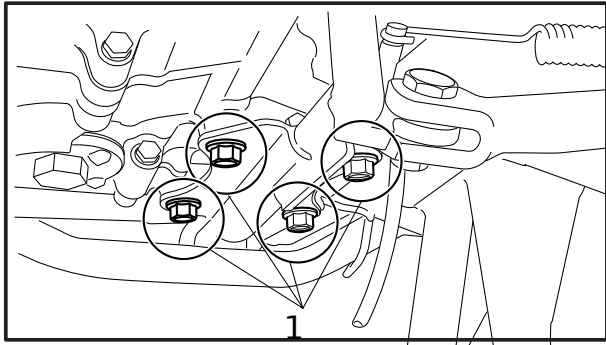
38 Nm (3.8 m•kg, 27 ft•lb)

- 9washer
- 9lower muffler bolt

17 Nm (1.7 m•kg, 13 ft•lb)

2. Install:
 - 9exhaust pipe nuts

15 Nm (1.5 m•kg, 11 ft•lb)



FOOTREST

1. Install:
 - 9footrest
 - 9footrest bolts 1

23 Nm (2.3 m•kg, 17 ft•lb)

CARBURETOR

1. Install:
 - 9carburetor assembly

Refer to “CARBURETOR” in chapter 6.
2. Adjust:
 - 9throttle cable free play
 - 9rear brake light operation timing

Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” and “ADJUSTING THE REAR BRAKE LIGHTSWITCH” in chapter 3.

Throttle cable free play
(at the flange of the throttle grip)
 3 – 7 mm (0.12 – 0.28 mm)

COOLING SYSTEM

1. Install:
 - 9water pump assembly
 - 9radiator assembly

Refer to “RADIATOR” and “WATER PUMP” in chapter 5.
2. Fill:
 - 9coolant

Refer to “CHANGING THE COOLANT” in chapter 3.

ENGINE OIL

1. Fill:
 - 9engine oil

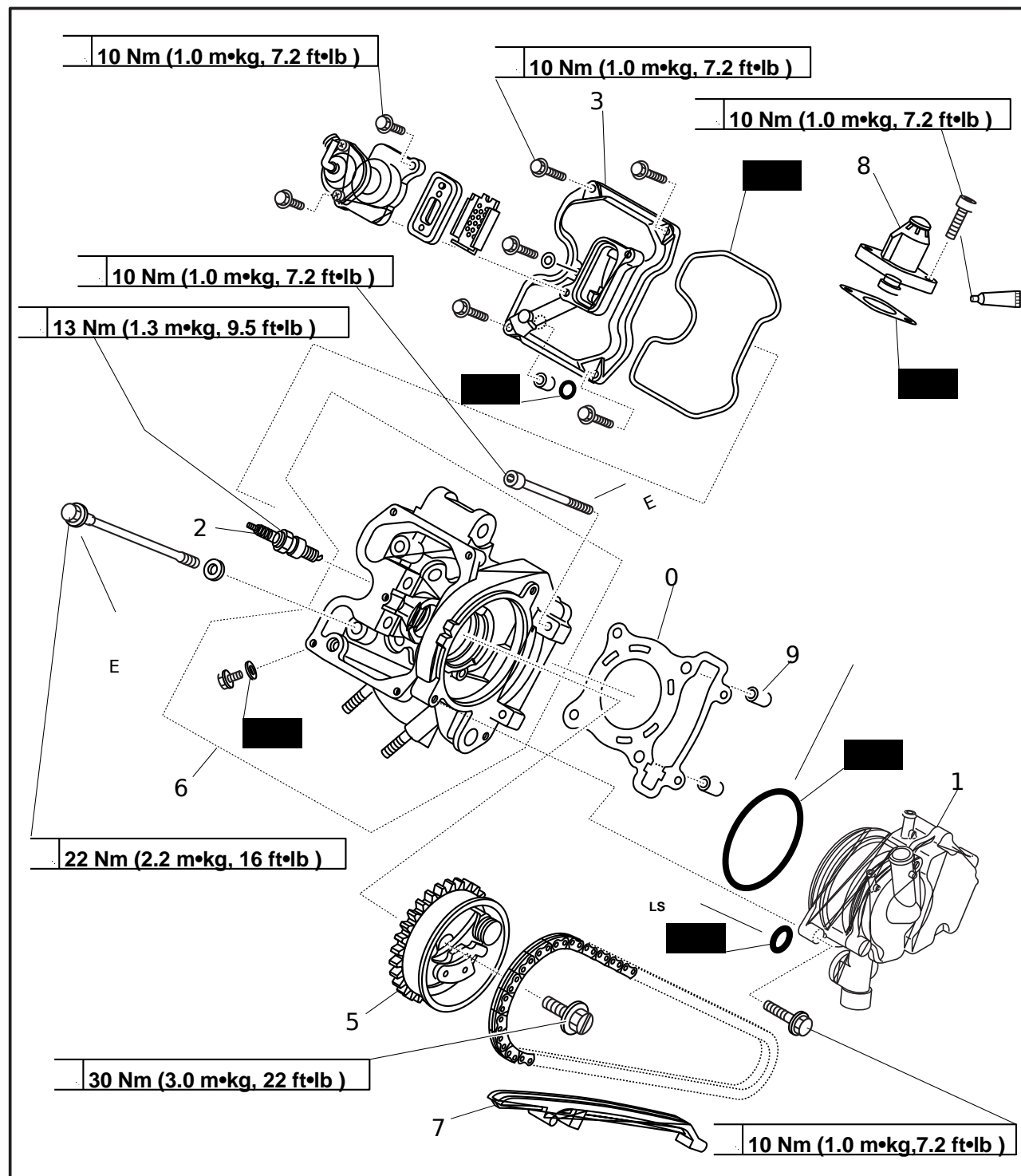
Refer to “CHANGING THE ENGINE OIL” in chapter 3.

EASF0023

CYLINDER HEAD

- 1 Water pump
- 2 Spark plug
- 3 Cylinder head cover
- 4 Dowel pin
- 5 Camshaft sprocket
- 6 Cylinder head
- 7 Timing chain guide (exhaust side)

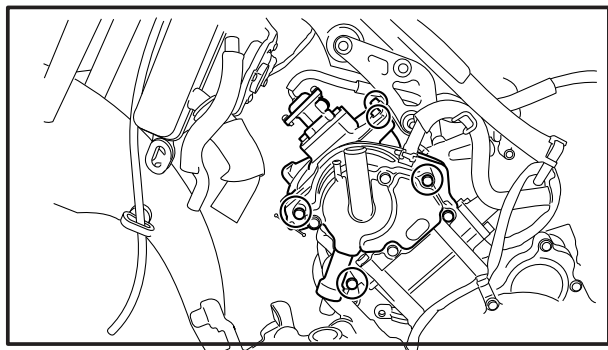
- 8 Timing chain tensioner
- 9 Dowel pin
- 0 Gasket



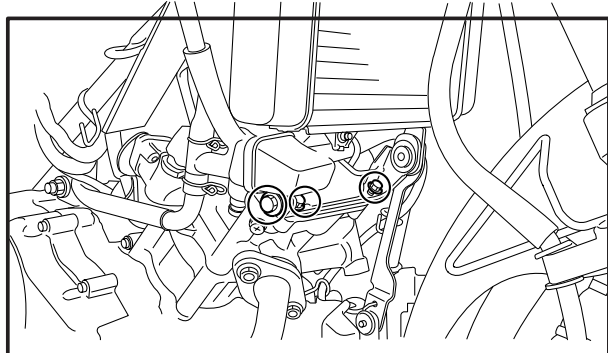
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REMOVING THE CYLINDER HEAD

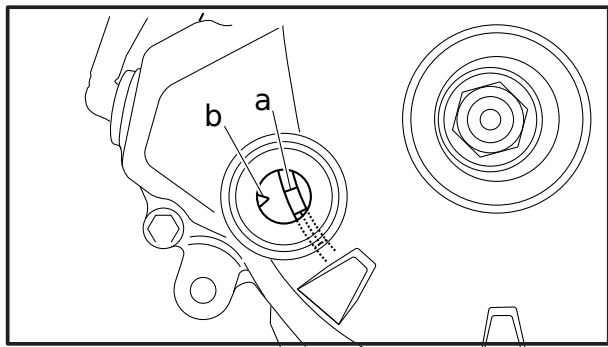
1. Remove
 - 9side cowlings (left and right)
 - 9front cowling
 - 9center panels (upper and lower)
 - 9rear cowlings (left and right)
Refer to "COVERS" in chapter 3.
 - 9carburetor assembly
Refer to "CARBURETOR" in chapter 6.
 - 9muffler
Refer to "REMOVING THE ENGINE".
2. Drain:
 - 9cooling system
Refer to "CHANGING THE COOLANT" in chapter 3.



3. Remove:
 - 9water pump assembly bolts
 - 9water pump assembly
 - 9O-rings



4. Remove:
 - 9spark plug cap 1
 - 9spark plug 2
5. Remove:
 - 9cylinder head cover bolts
 - 9cylinder head cover
 - 9gasket
 - 9dowel pin
 - 9O-ring

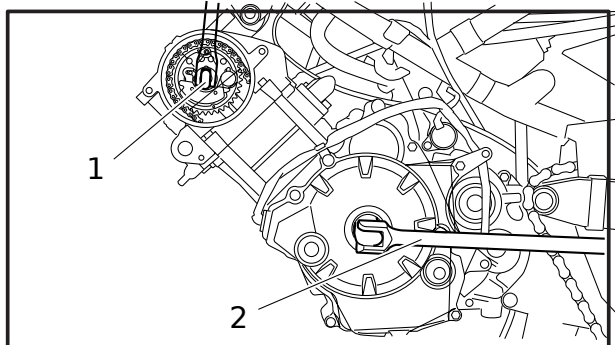
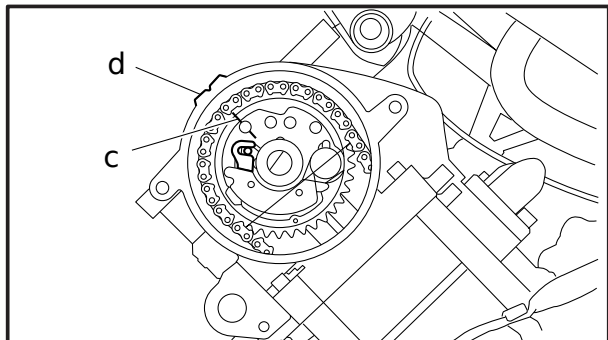


6. Align:
 9 "I" mark a on the generator rotor
 (with the stationary pointer b on the crankcase)

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- a. Turn the crankshaft counterclockwise.
 b. When the piston is at TDC on the compression stroke, align the "I" mark c on the camshaft sprocket with the stationary pointer d on the cylinder head.

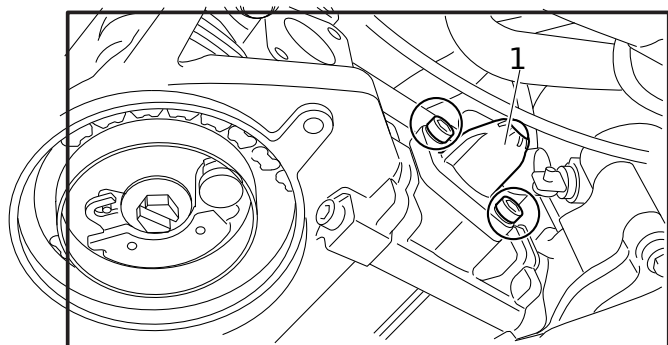
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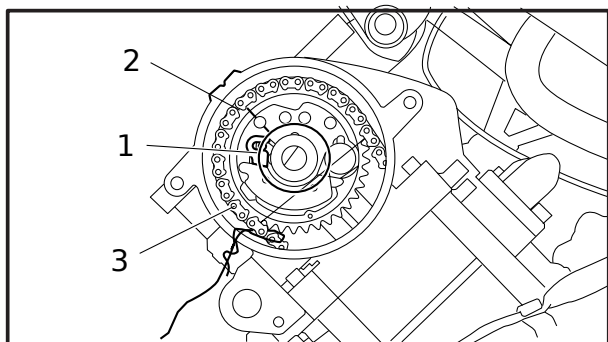
7. Loosen:
 9 camshaft sprocket bolt 1

NOTE:

While holding the generator rotor with a wrench 2, loosen the camshaft sprocket bolt.



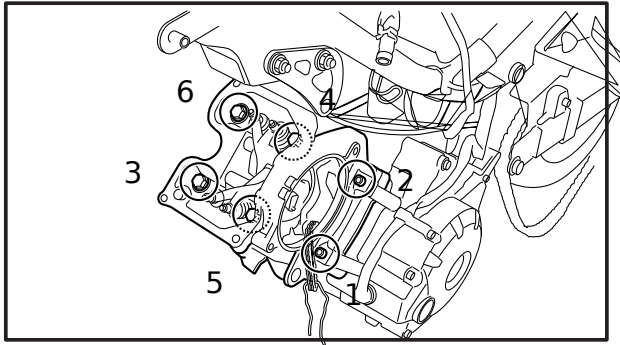
8. Remove:
 9 timing chain tensioner cap bolt
 9 timing chain tensioner bolts
 9 timing chain tensioner 1
 9 gasket



9. Remove:
 9 camshaft sprocket bolt 1
 9 camshaft sprocket 2
 9 timing chain 3

NOTE:

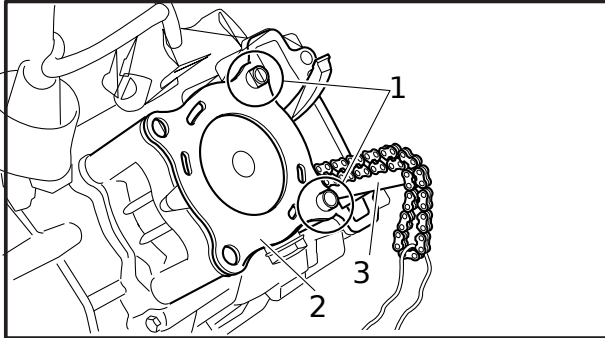
To prevent the timing chain from falling into the crankcase, fasten it with a wire.



10. Remove:
- 9engine mount nut
 - 9washer
 - 9engine mount bolt
 - 9cylinder head bolts
 - 9cylinder head bolts
 - 9washers
 - 9cylinder head

NOTE:

- 9Loosen the nuts in the proper sequence as shown.
- 9Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.



11. Remove:
- 9dowel pins 1
 - 9gasket 2
 - 9timing chain guide (exhaust side) 3

EAS00227

CHECKING THE CYLINDER HEAD

1. Eliminate:
- 9combustion chamber carbon deposits (with a rounded scraper)

NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

- 9spark plug bore threads
- 9valve seats

2. Check:
- 9cylinder head
 - Damage/scratches → Replace.



3. Measure:

9cylinder head warpage

Out of specification → Resurface the cylinder head.

Maximum cylinder head warpage 0.03 mm (0.0012 in)
--

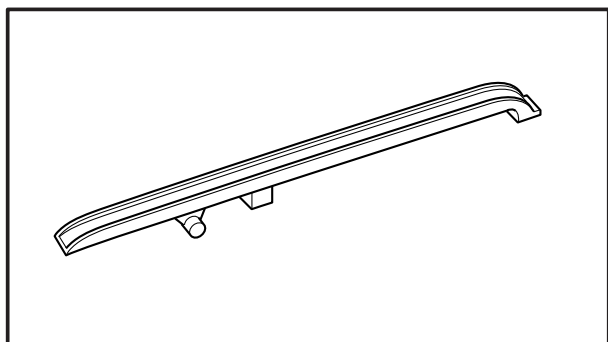
☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- Place a straightedge 1 and a thickness gauge 2 across the cylinder head.
- Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.
- Place a 400 ~ 600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

NOTE:

To ensure an even surface, rotate the cylinder head several times.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

**CHECKING TIMING CHAIN GUIDE**

1. Check:

9timing chain guide (exhaust side)

Damage/wear → Replace.

EAS00210

CHECKING THE TIMING CHAIN TENSIONER

1. Check:

9timing chain tensioner

Cracks/damage → Replace.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver 1.
- Remove the screwdriver and slowly release the timing chain tensioner rod.
- Make sure that the timing chain tensioner rod comes out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.

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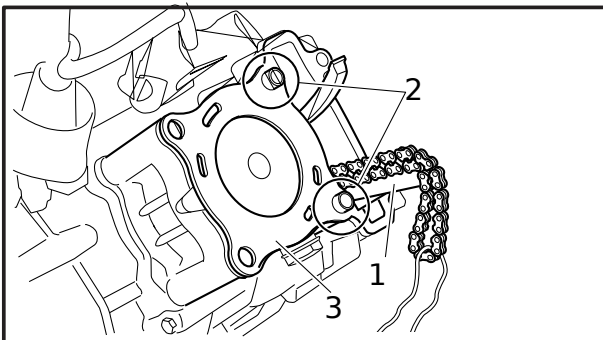
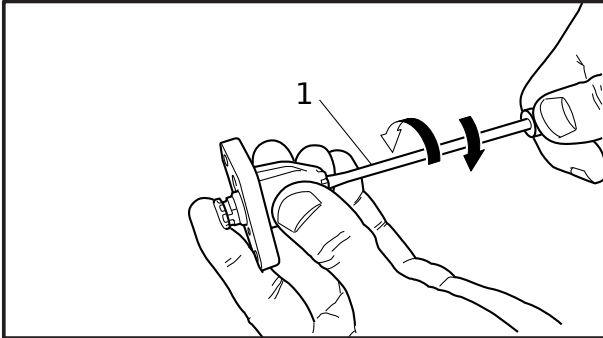
2. Check:

9cap bolt

9one-way cam

9timing chain tensioner rod

Damage/wear → Replace the defective part(s).



EAS00232

INSTALLING THE CYLINDER HEAD

1. Install:

9timing chain guide (exhaust side) 1

9dowel pins 2

9gasket 3

2. Install:

9cylinder head

9washers

9cylinder head bolts

9cylinder head bolts

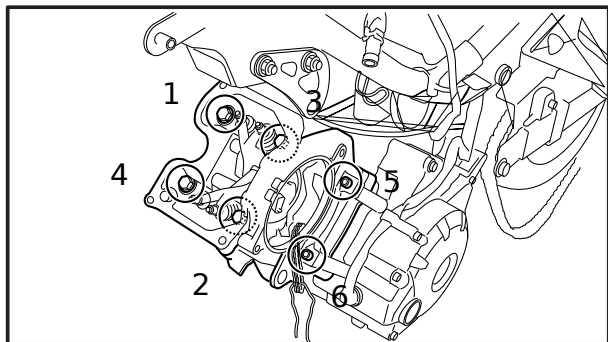
9engine mount bolt

9washer

9engine mount nut

NOTE:

Pass the timing chain through the timing chain cavity.



3. Tighten:

9cylinder head bolts

22 Nm (2.2 m•kg, 16 ft•lb)

9cylinder head bolts

10 Nm (1.0 m•kg, 7.2 ft•lb)

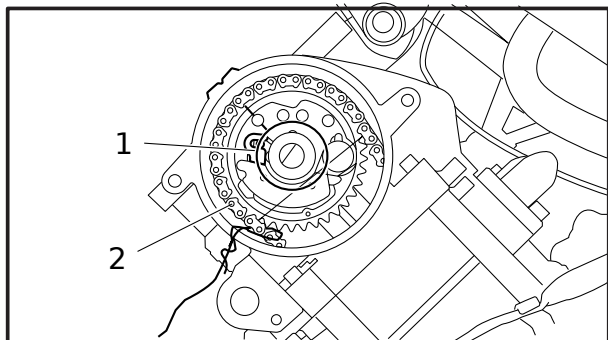
9engine mount nut

72 Nm (7.2 m•kg, 52 ft•lb)

NOTE:

9Lubricate the cylinder head bolts with engine oil.

9Tighten the cylinder head bolts in the proper tightening sequence as shown and torque them in two stages.



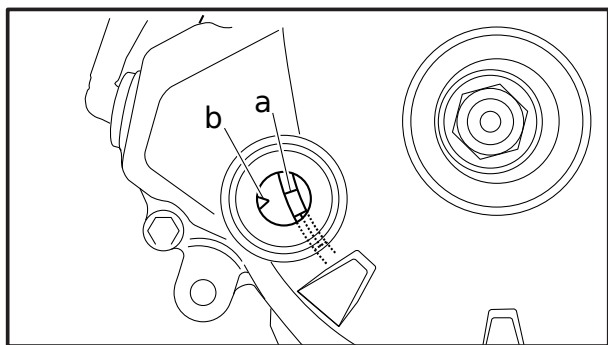
4. Install:

9camshaft sprocket 1

9timing chain 2

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

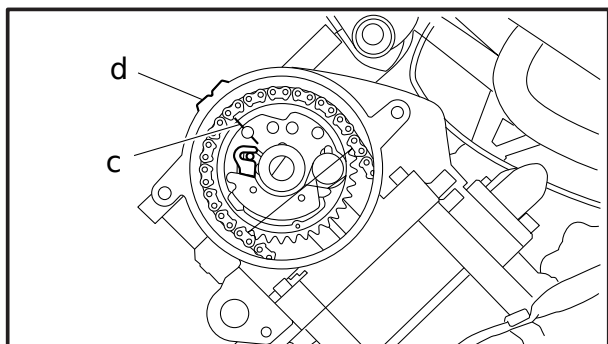
- Turn the crankshaft clockwise.
- Align the "I" mark **a** on the generator rotor with the stationary pointer **b** on the crankcase.
- Align the "I" mark **c** on the camshaft sprocket with the stationary pointer **d** on the cylinder head.
- Install the timing chain onto the camshaft sprocket, and then install the camshaft sprocket onto the camshaft.



NOTE:

9When installing the camshaft sprocket, be sure to keep the timing chain as tight as possible on the exhaust side.

9Align the projection **C** on the camshaft sprocket with the slot in the camshaft.

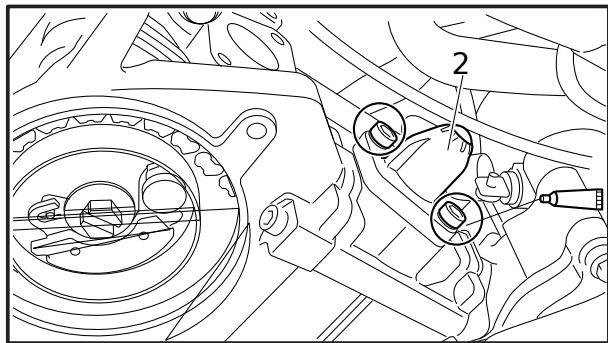
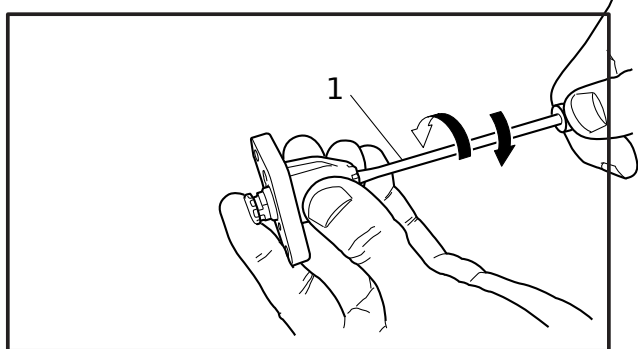


C

Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

- While holding the camshaft, temporarily tighten the camshaft sprocket bolt.
- Remove the wire from the timing chain.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆



5. Install:

9timing chain tensioner

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver 1 .

NOTE: _____

Make sure that the tensioner rod has been fully set clockwise.

- b. Install the gasket and the timing chain tensioner 2 onto the cylinder.

W _____

Always use a new gasket.

NOTE: _____

Apply the YAMAHAbond 1215 onto the bolts.

Yamaha bond No. 1215

90890-85505

Timing chain tensioner bolt

10 Nm (1.0 m•kg, 7.2 ft•lb)

- c. Turn the timing chain tensioner rod counter-clockwise with a thin screwdriver 1 , make sure it releases, and then tighten the cap bolt to specification.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

6. Tighten:

9camshaft sprocket bolt

30 Nm (3.0 m•kg, 22 ft•lb)

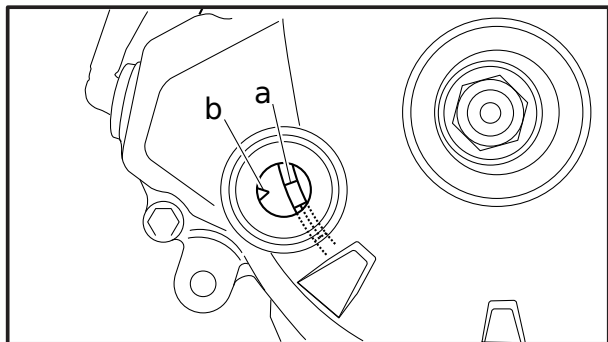
cC _____

Be sure to tighten the camshaft sprocket bolt to the specified torque to avoid the possibility of the bolt coming loose and damaging the engine.

7. Turn:

9crankshaft

(several turns clockwise)



8. Check:

9 "I" mark a

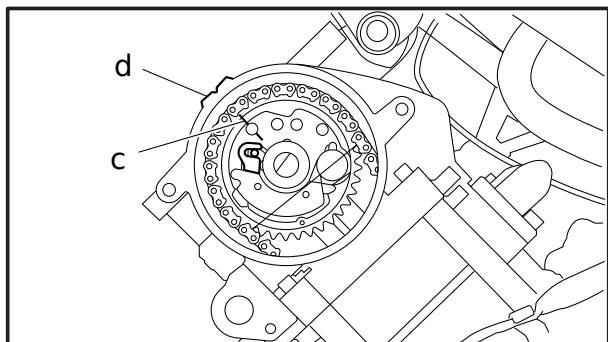
Align the "I" mark on the generator rotor with the stationary pointer b on the crankcase.

9 "I" mark c

Align the "I" mark on the camshaft sprocket with the stationary pointer d on the cylinder head.

Out of alignment → Correct.

Refer to the installation steps above.



9. Measure:

9 valve clearance

Out of specification → Adjust.

Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.

10. Install:

9 O-rings

9 water pump assembly

9 water pump assembly bolts

10 Nm (1.0 m•kg, 7.2 ft•lb)

11. Install:

9 spark plug

13 Nm (1.3 m•kg, 9.5 ft•lb)

12. Install:

9 intake manifold bolts

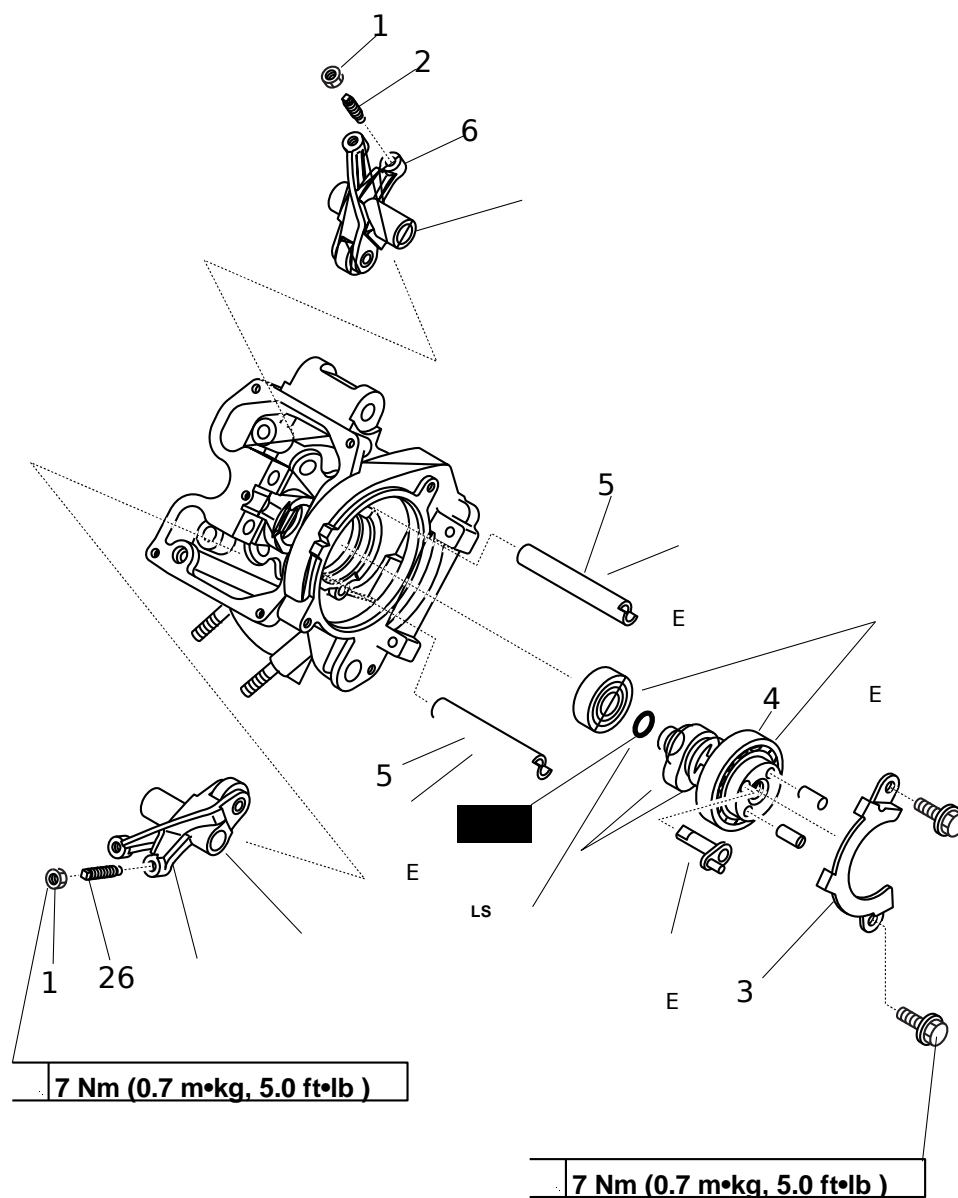
9 intake manifold with carburetor

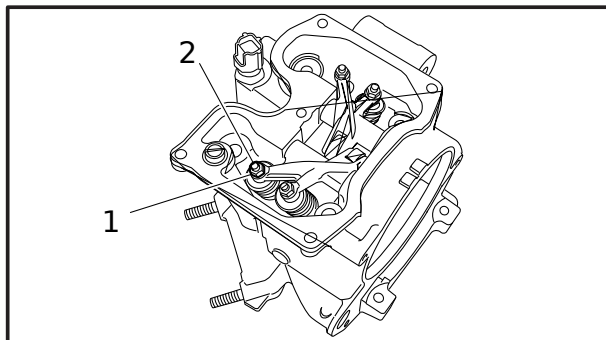
10 Nm (1.0 m•kg, 7.2 ft•lb)

EASf0020

CAMSHAFT

- 1 Locknut
- 2 Adjusting screw
- 3 Camshaft retainer
- 4 Camshaft
- 5 Rocker arm shaft
- 6 Rocker arm





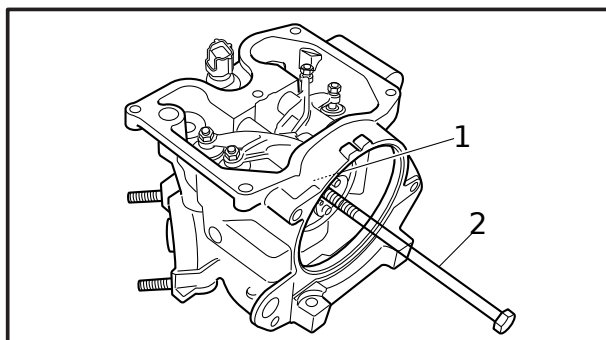
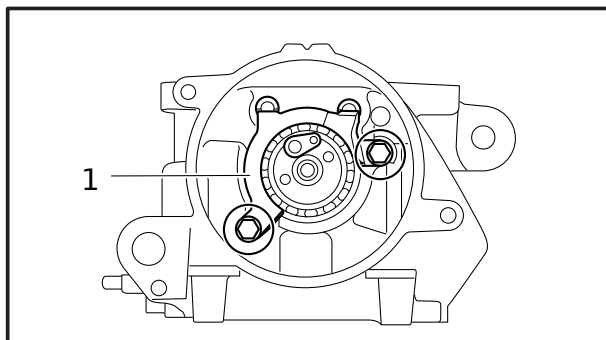
EASF0022

REMOVING THE ROCKER ARMS AND CAMSHAFT

NOTE:

Prior to remove the rocker arms and camshaft, remove the cylinder head.

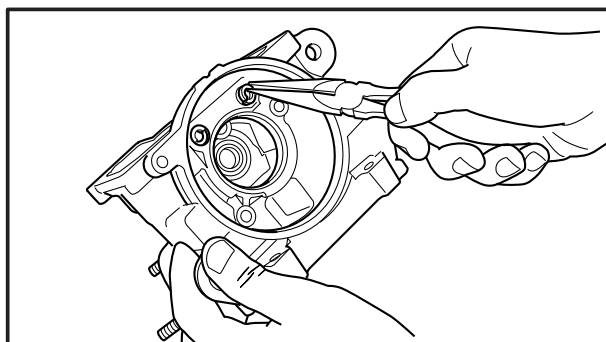
1. Loosen:
 - 9locknuts 1
 - 9adjusting screws 2
2. Remove:
 - 9camshaft retainer 1



3. Remove:
 - 9camshaft 1

NOTE:

Screw an 8 mm bolt 2 into the threaded end of the camshaft and then pull out the camshaft.



4. Remove:
 - 9rocker arm shafts
 - 9rocker arms

EAS00205

CHECKING THE CAMSHAFT

1. Check:

9camshaft lobes

Blue discoloration/pitting/scratches

→ Replace the camshaft.

2. Measure:

9camshaft lobe dimensions a and b

Out of specification → Replace the camshaft.

Camshaft lobe dimension limit**Intake**aa **29.613 mm (1.1659 in)**bb **25.043 mm (0.9859 in)****Exhaust**aa **29.912 mm (1.1776 in)**bb **24.989 mm (0.9838 in)**

3. Check:

9camshaft oil passage

Obstructions → Blow out with compressed air.

EAS00206

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

The following procedure applies to all of the rocker arms and rocker arm shafts.

1. Check:

9rocker arm

Damage/wear → Replace.

2. Check:

9rocker arm shaft

Blue discoloration/excessive wear/pitting/
scratches → Replace or check the lubrica-
tion system.

3. Measure:

9rocker arm inside diameter

Out of specification → Replace.

Rocker arm inside diameter**9.985 – 10.000 mm****(0.3931 – 0.3937 in)****<Limit>: 9.950 mm (0.3917 in)**

4. Measure:

9rocker arm shaft outside diameter

Out of specification → Replace.

Rocker arm shaft outside diameter**9.966 – 9.976 mm****(0.3924 – 0.3928 in)****<Limit>: 9.950 mm (0.3917 in)**

5. Calculate:

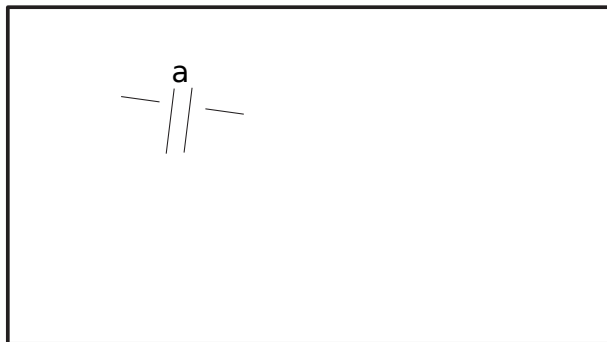
9rocker-arm-to-rocker-arm-shaft clearance

NOTE:

Calculate the clearance by subtracting the rock-
er arm shaft outside diameter from the rocker
arm inside diameter.

Above 0.08 mm → Replace the rocker arm and
rocker arm shaft as a set.

**Rocker-arm-to-rocker-arm-shaft
clearance****0.009 – 0.034 mm****(0.0004 – 0.0013 in)****<Limit>: 0.080 mm (0.0031 in)**



EAS00207

CHECKING THE CAMSHAFT SPROCKET

1. Check:

9camshaft sprocket

Worn more than 1/4 tooth a → Replace the camshaft sprocket and the timing chain as a set.

a 1/4 tooth

b Correct

1 Timing chain

2 Camshaft sprocket

EAS00219

INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:

9camshaft journals

Recommended lubricant
Engine oil

2. Lubricate:

9rocker arm inside surface

9camshaft oil passage

Recommended lubricant
Molybdenum disulfide grease

3. Install:

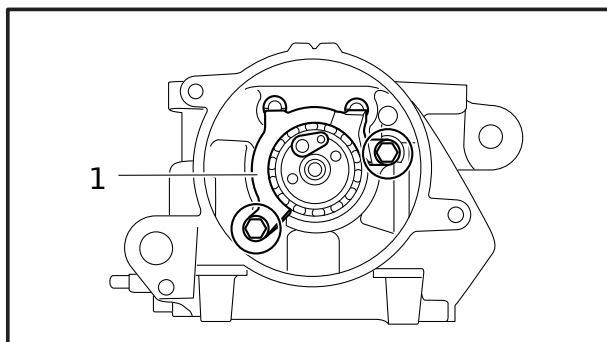
9camshaft retainer 1

9camshaft retainer bolt

7 Nm (0.7 m•kg, 5.0 ft•lb)

NOTE:

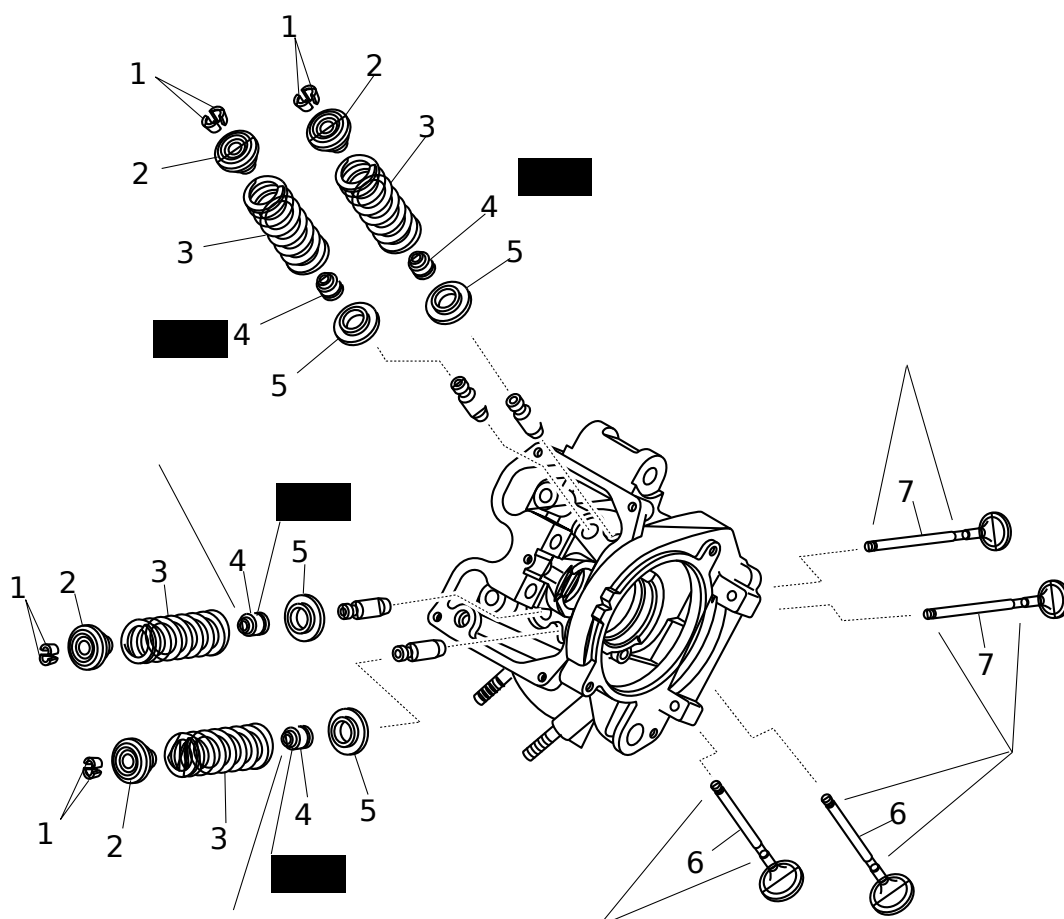
Install the camshaft retainer with the bent ends facing inward.



EASF0024

VALVES AND VALVE SPRINGS

- 1 Valve cotter
- 2 Upper spring seat
- 3 Valve spring
- 4 Valve stem seal
- 5 Lower spring seat
- 6 Intake valve
- 7 Exhaust valve



EASF0025

REMOVING THE VALVES**NOTE:**

Prior to remove the valves, remove the cylinder head, camshaft and rocker arms.

The following procedure applies to all of the valves and related components.

NOTE:

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Check:

9 valve sealing

Leakage at the valve seat → Check the valve face, valve seat, and valve seat width. Refer to "CHECKING THE VALVE SEATS".

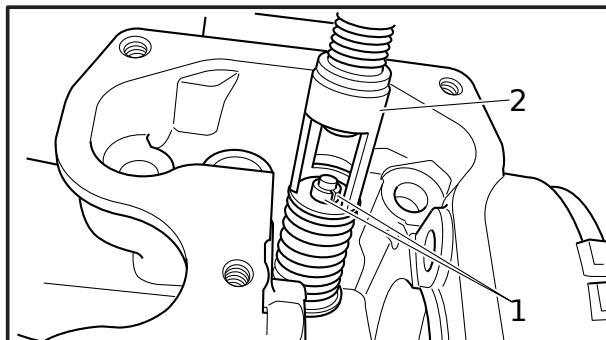
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- Pour a clean solvent a into the intake and exhaust ports.
- Check that the valves properly seal.

NOTE:

There should be no leakage at the valve seat 1 .

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆



2. Remove:
 9 valve cotter pins 1

NOTE:

Remove the valve cotter pins by compressing the valve spring with the valve spring compressor 2.

Valve spring compressor
90890-04019
Valve spring compressor
attachment
90890-04108

3. Remove:
 9 upper spring seat 1
 9 valve spring 2
 9 valve stem seal 3
 9 lower spring seat 4
 9 valve 5

NOTE:

Identify the position of each part very carefully so that it can be reinstalled in its original place.

EAS00239

CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

1. Measure:
 9 valve-stem-to-valve-guide clearance

Valve-stem-to-valve-guide clearance =
Valve guide inside diameter aa –
Valve stem diameter bb

Out of specification → Replace the valve guide.

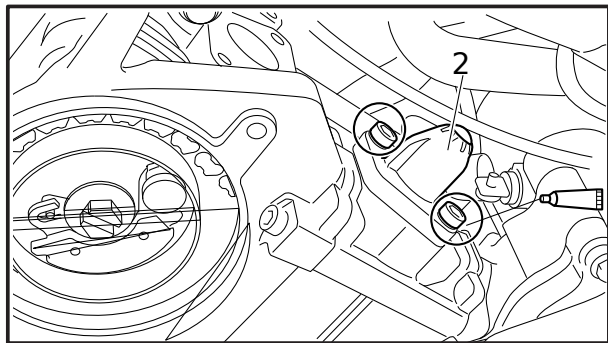
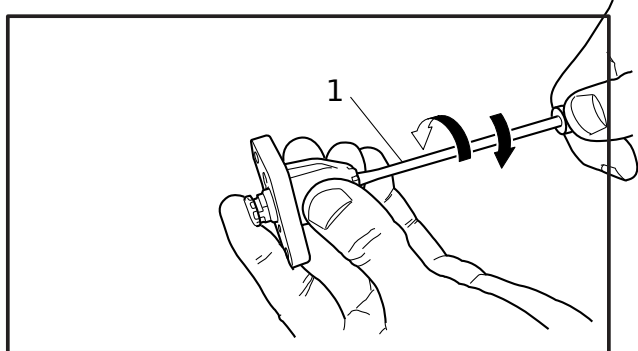
Valve-stem-to-valve-guide clearance

Intake

0.010 – 0.037 mm
(0.0004 – 0.0015 in)
<Limit>: 0.08 mm (0.0032 in)

Exhaust

0.025 – 0.052 mm
(0.001 – 0.002 in)
<Limit>: 0.10 mm (0.0039 in)



5. Install:

9timing chain tensioner

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver 1 .

NOTE: _____

Make sure that the tensioner rod has been fully set clockwise.

- b. Install the gasket and the timing chain tensioner 2 onto the cylinder.

W _____

Always use a new gasket.

NOTE: _____

Apply the YAMAHAbond 1215 onto the bolts.

Yamaha bond No. 1215

90890-85505

Timing chain tensioner bolt

10 Nm (1.0 m•kg, 7.2 ft•lb)

- c. Turn the timing chain tensioner rod counter-clockwise with a thin screwdriver 1 , make sure it releases, and then tighten the cap bolt to specification.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

6. Tighten:

9camshaft sprocket bolt

30 Nm (3.0 m•kg, 22 ft•lb)

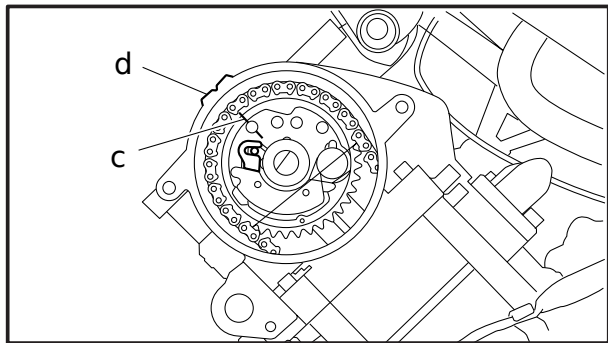
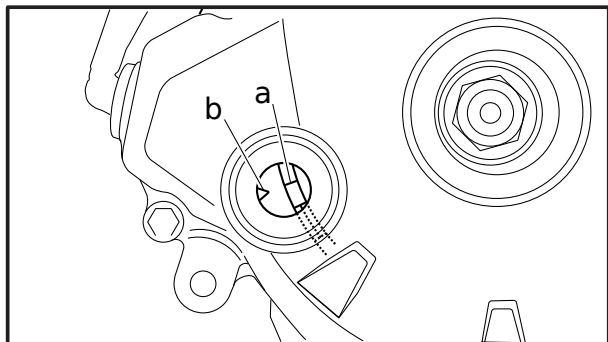
cC _____

Be sure to tighten the camshaft sprocket bolt to the specified torque to avoid the possibility of the bolt coming loose and damaging the engine.

7. Turn:

9crankshaft

(several turns clockwise)



8. Check:

9 "I" mark a

Align the "I" mark on the generator rotor with the stationary pointer b on the crankcase.

9 "I" mark c

Align the "I" mark on the camshaft sprocket with the stationary pointer d on the cylinder head.

Out of alignment → Correct.

Refer to the installation steps above.

9. Measure:

9 valve clearance

Out of specification → Adjust.

Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.

10. Install:

9 O-rings

9 water pump assembly

9 water pump assembly bolts

10 Nm (1.0 m•kg, 7.2 ft•lb)

11. Install:

9 spark plug

13 Nm (1.3 m•kg, 9.5 ft•lb)

12. Install:

9 intake manifold bolts

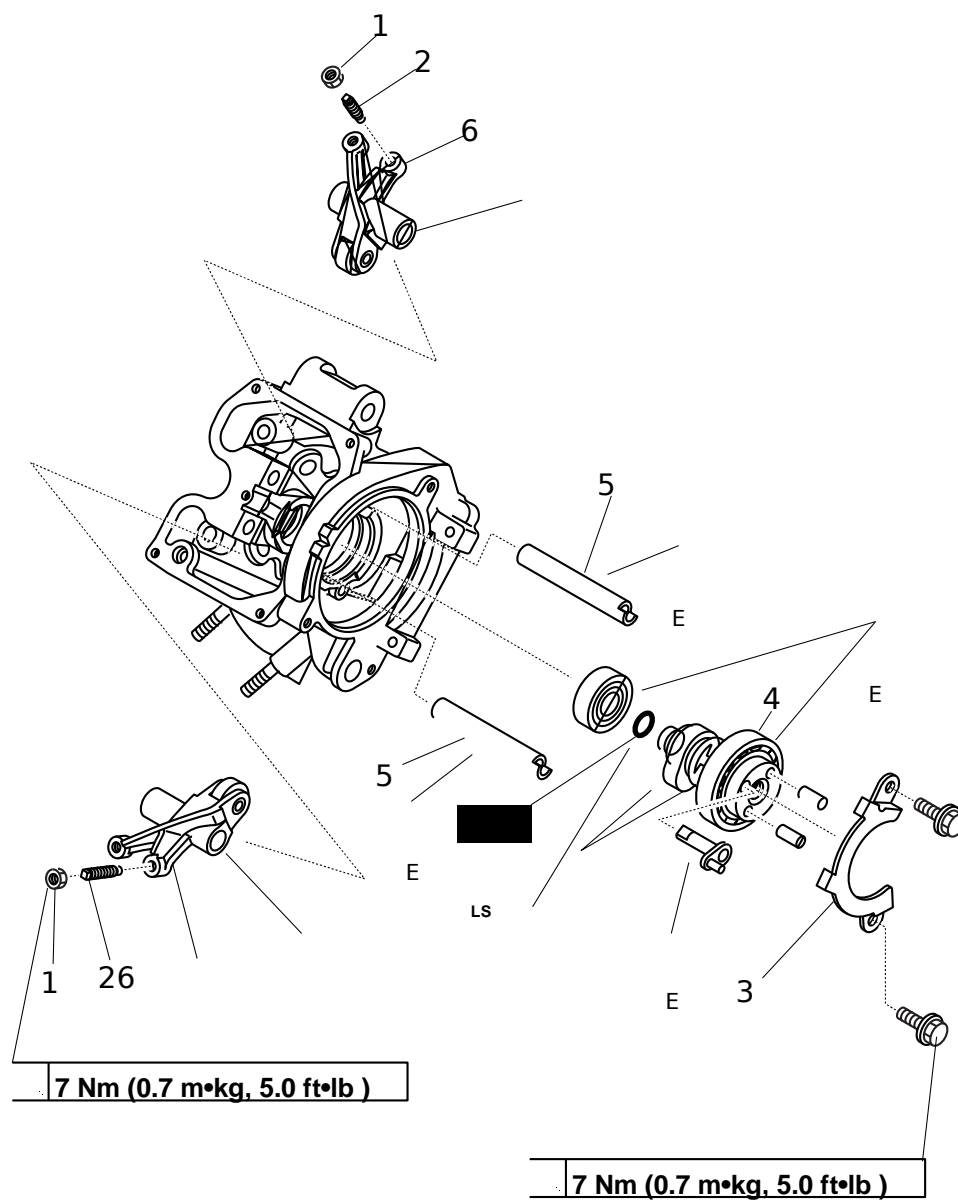
9 intake manifold with carburetor

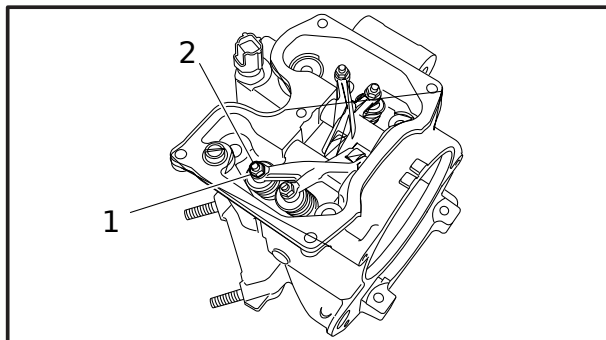
10 Nm (1.0 m•kg, 7.2 ft•lb)

EASf0020

CAMSHAFT

- 1 Locknut
- 2 Adjusting screw
- 3 Camshaft retainer
- 4 Camshaft
- 5 Rocker arm shaft
- 6 Rocker arm





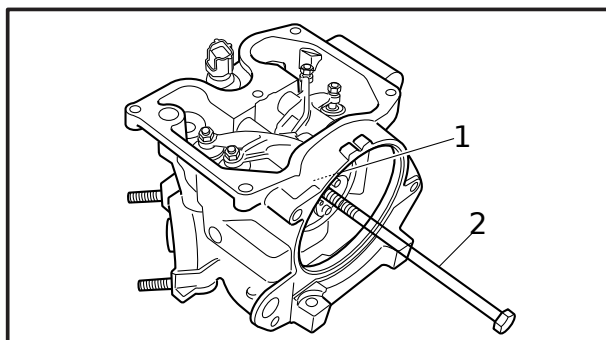
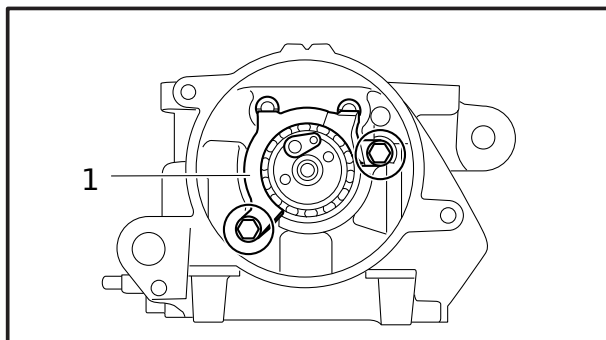
EASF0022

REMOVING THE ROCKER ARMS AND CAMSHAFT

NOTE:

Prior to remove the rocker arms and camshaft, remove the cylinder head.

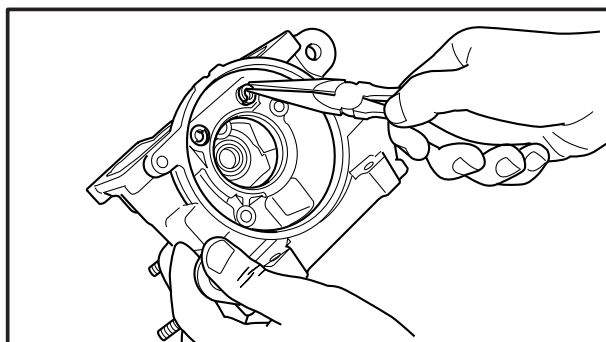
1. Loosen:
 - 9locknuts 1
 - 9adjusting screws 2
2. Remove:
 - 9camshaft retainer 1



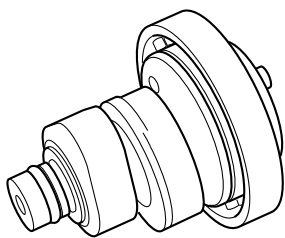
3. Remove:
 - 9camshaft 1

NOTE:

Screw an 8 mm bolt 2 into the threaded end of the camshaft and then pull out the camshaft.



4. Remove:
 - 9rocker arm shafts
 - 9rocker arms



EAS00205

CHECKING THE CAMSHAFT

1. Check:

9camshaft lobes

Blue discoloration/pitting/scratches

→ Replace the camshaft.

2. Measure:

9camshaft lobe dimensions a and b

Out of specification → Replace the camshaft.

Camshaft lobe dimension limit**Intake**aa **29.613 mm (1.1659 in)**bb **25.043 mm (0.9859 in)****Exhaust**aa **29.912 mm (1.1776 in)**bb **24.989 mm (0.9838 in)**

3. Check:

9camshaft oil passage

Obstructions → Blow out with compressed air.

EAS00206

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

The following procedure applies to all of the rocker arms and rocker arm shafts.

1. Check:

9rocker arm

Damage/wear → Replace.

2. Check:

9rocker arm shaft

Blue discoloration/excessive wear/pitting/
scratches → Replace or check the lubrica-
tion system.

3. Measure:

9rocker arm inside diameter

Out of specification → Replace.

Rocker arm inside diameter**9.985 – 10.000 mm****(0.3931 – 0.3937 in)****<Limit>: 9.950 mm (0.3917 in)**

4. Measure:

9rocker arm shaft outside diameter

Out of specification → Replace.

Rocker arm shaft outside diameter**9.966 – 9.976 mm****(0.3924 – 0.3928 in)****<Limit>: 9.950 mm (0.3917 in)**

5. Calculate:

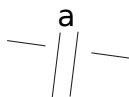
9rocker-arm-to-rocker-arm-shaft clearance

NOTE:

Calculate the clearance by subtracting the rock-
er arm shaft outside diameter from the rocker
arm inside diameter.

Above 0.08 mm → Replace the rocker arm and
rocker arm shaft as a set.

**Rocker-arm-to-rocker-arm-shaft
clearance****0.009 – 0.034 mm****(0.0004 – 0.0013 in)****<Limit>: 0.080 mm (0.0031 in)**



EAS00207

CHECKING THE CAMSHAFT SPROCKET

1. Check:

9camshaft sprocket

Worn more than 1/4 tooth a → Replace the camshaft sprocket and the timing chain as a set.

a 1/4 tooth

b Correct

1 Timing chain

2 Camshaft sprocket

EAS00219

INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:

9camshaft journals

Recommended lubricant
Engine oil

2. Lubricate:

9rocker arm inside surface

9camshaft oil passage

Recommended lubricant
Molybdenum disulfide grease

3. Install:

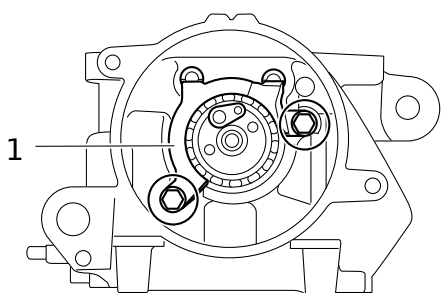
9camshaft retainer 1

9camshaft retainer bolt

7 Nm (0.7 m•kg, 5.0 ft•lb)

NOTE:

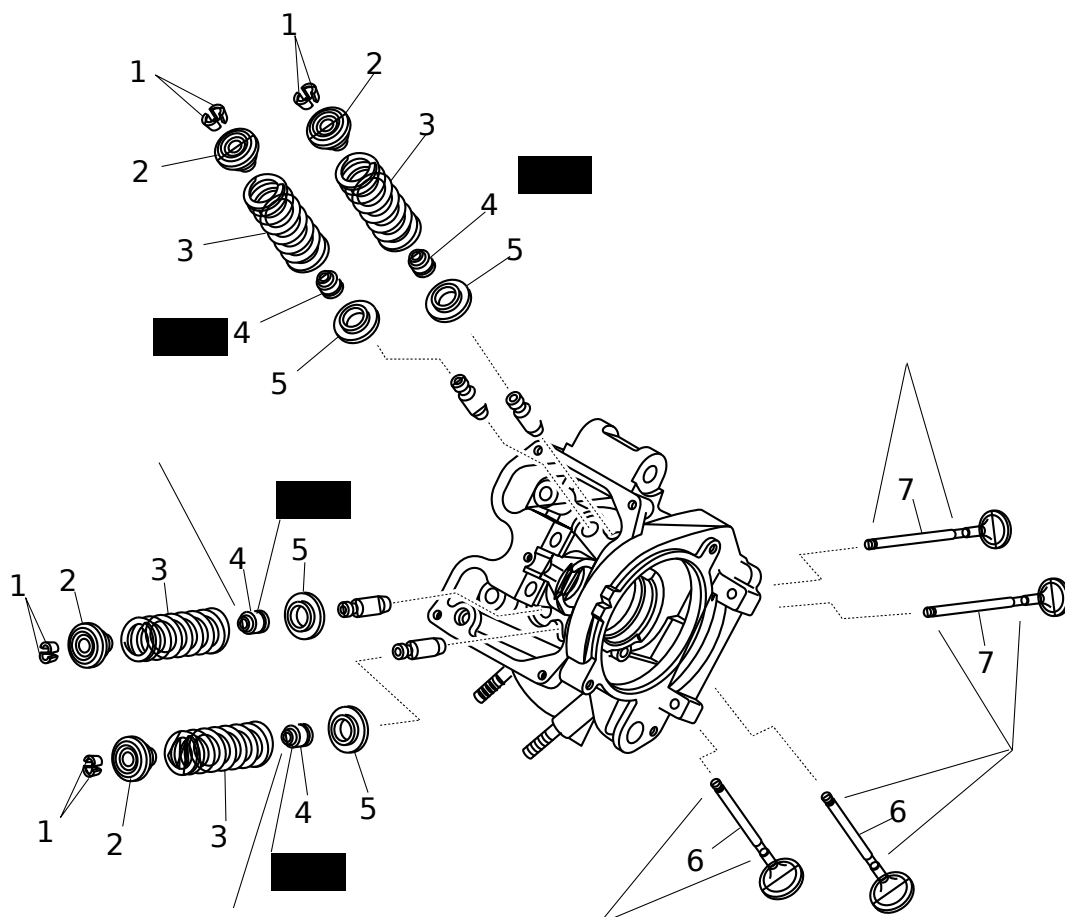
Install the camshaft retainer with the bent ends facing inward.



EASF0024

VALVES AND VALVE SPRINGS

- 1 Valve cotter
- 2 Upper spring seat
- 3 Valve spring
- 4 Valve stem seal
- 5 Lower spring seat
- 6 Intake valve
- 7 Exhaust valve



EASF0025

REMOVING THE VALVES**NOTE:**

Prior to remove the valves, remove the cylinder head, camshaft and rocker arms.

The following procedure applies to all of the valves and related components.

NOTE:

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Check:

9 valve sealing

Leakage at the valve seat → Check the valve face, valve seat, and valve seat width. Refer to "CHECKING THE VALVE SEATS".

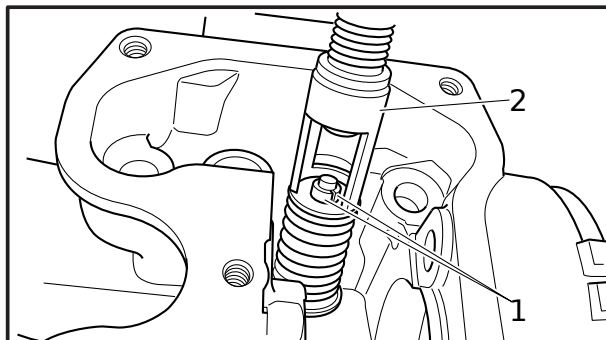
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- Pour a clean solvent a into the intake and exhaust ports.
- Check that the valves properly seal.

NOTE:

There should be no leakage at the valve seat 1 .

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2. Remove:
 9 valve cotter pins 1

NOTE:

Remove the valve cotter pins by compressing the valve spring with the valve spring compressor 2.

Valve spring compressor
90890-04019
Valve spring compressor
attachment
90890-04108

3. Remove:
 9 upper spring seat 1
 9 valve spring 2
 9 valve stem seal 3
 9 lower spring seat 4
 9 valve 5

NOTE:

Identify the position of each part very carefully so that it can be reinstalled in its original place.

EAS00239

CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

1. Measure:
 9 valve-stem-to-valve-guide clearance

Valve-stem-to-valve-guide clearance =
Valve guide inside diameter aa –
Valve stem diameter bb

Out of specification → Replace the valve guide.

Valve-stem-to-valve-guide clearance

Intake

0.010 – 0.037 mm
(0.0004 – 0.0015 in)
<Limit>: 0.08 mm (0.0032 in)

Exhaust

0.025 – 0.052 mm
(0.001 – 0.002 in)
<Limit>: 0.10 mm (0.0039 in)

2. Replace:
9valve guide

NOTE:

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 ° C in an oven.

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- Remove the valve guide with the valve guide remover 1 .
- Install the new valve guide with the valve guide installer 2 and valve guide remover 1 .
- After installing the valve guide, bore the valve guide with the valve guide reamer 3 to obtain the proper valve-stem-to-valve-guide clearance.

NOTE:

After replacing the valve guide, reface the valve seat.

Valve guide remover (4.5 mm)
90890-04116
Valve guide installer (4.5 mm)
90890-04117
Valve guide reamer (4.5 mm)
90890-04118

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3. Eliminate:
9carbon deposits
(from the valve face and valve seat)
4. Check:
9valve face
Pitting/wear → Grind the valve face.
9valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

- 5.Measure:
9valve margin thickness a
Out of specification Replace the valve.

Valve margin thickness
Intake: 0.5 – 0.9 mm
(0.0197 – 0.0433 in)
Exhaust: 0.5 – 0.9 mm
(0.0197 – 0.0433 in)

6. Measure:

9valve stem runout

Out of specification → Replace the valve.

NOTE:

9When installing a new valve, always replace the valve guide.

9If the valve is removed or replaced, always replace the valve stem seal.

Valve stem runout limit 0.01 mm (0.0004 in)
--

EAS00240

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:

9carbon deposits

(from the valve face and valve seat)

2. Check:

9valve seat

Pitting/wear → Replace the cylinder head.

3. Measure:

9valve seat width a

Out of specification → Replace the cylinder head.

Valve seat width
Intake: 0.9 – 1.1 mm
(0.0354 – 0.0433 in)
Exhaust: 0.9 – 1.1 mm
(0.0354 – 0.0433 in)
<Limit>: 1.6 mm

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- Apply Mechanic's blueing dye (Dykem) onto the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear impression.
- Measure the valve seat width.

NOTE:

Where the valve seat and valve face contacted one another, the blueing will have been removed.

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4. Lap:

9 valve face

9 valve seat

NOTE:

After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

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- a. Apply a coarse lapping compound a to the valve face.

cC

Do not let the lapping compound enter the gap between the valve stem and the valve guide.

- b. Apply molybdenum oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

NOTE:

For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply Mechanic's blueing dye (Dykem) b onto the valve face.
- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.

- j. Measure the valve seat width c again. If the valve seat width is out of specification, reface and lap the valve seat.

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EAS00241

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:

a valve spring free length

Out of specification → Replace the valve spring.

Valve spring free length

**Intake and exhaust valve
springs**

47.33 mm (1.86 in)

<Limit>: 44.96 mm (1.77 in)

2. Measure:

a compressed valve spring force

Out of specification → Replace the valve spring.

- b Installed length

**Compressed valve spring force
(installed)**

**Intake and exhaust valve
springs**

135.6 – 156.0 N

(13.83 – 15.91 kgf) at 24.2 mm

3. Measure:

a valve spring tilt

Out of specification → Replace the valve spring.

Spring tilt limit

**Intake and exhaust valve
springs**

2.0 mm (0.08 in)

EAS00245

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

1. Deburr:
 - 9 valve stem end
 - (with an oil stone)

2. Lubricate:
 - 9 valve stem 1
 - 9 valve stem seal 2
 - (with the recommended lubricant)

	Recommended lubricant Molybudemium oil
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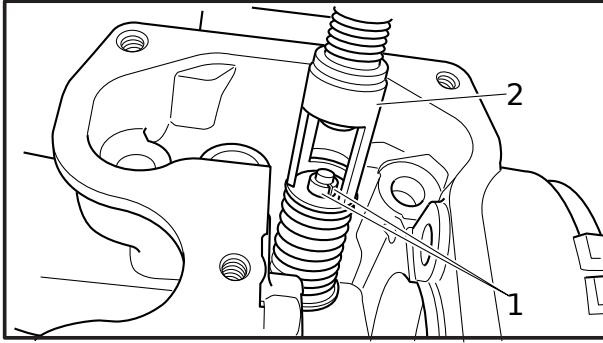
3. Install:
 - 9 valve 1
 - 9 lower spring seat 2
 - 9 valve stem seal 3
 - 9 valve spring 4
 - 9 upper spring seat 5
 - (into the cylinder head)

NOTE:

Install the valve spring with the larger pitch **a** facing up.

- b Smaller pitch

M



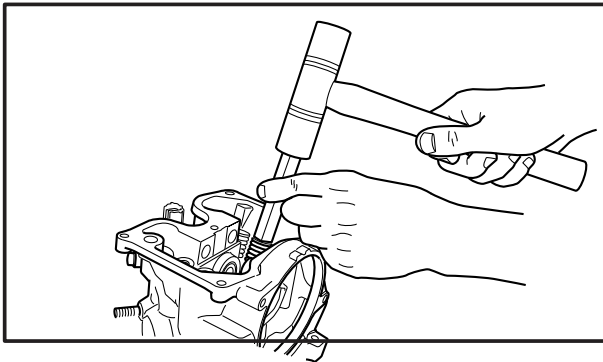
4. Install:
9 valve cotters 1

NOTE:

Install the valve cotters by compressing the valve spring with the valve spring compressor 2

Valve spring compressor
90890-04019

Valve spring compressor
attachment
90890-04108



5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

cC

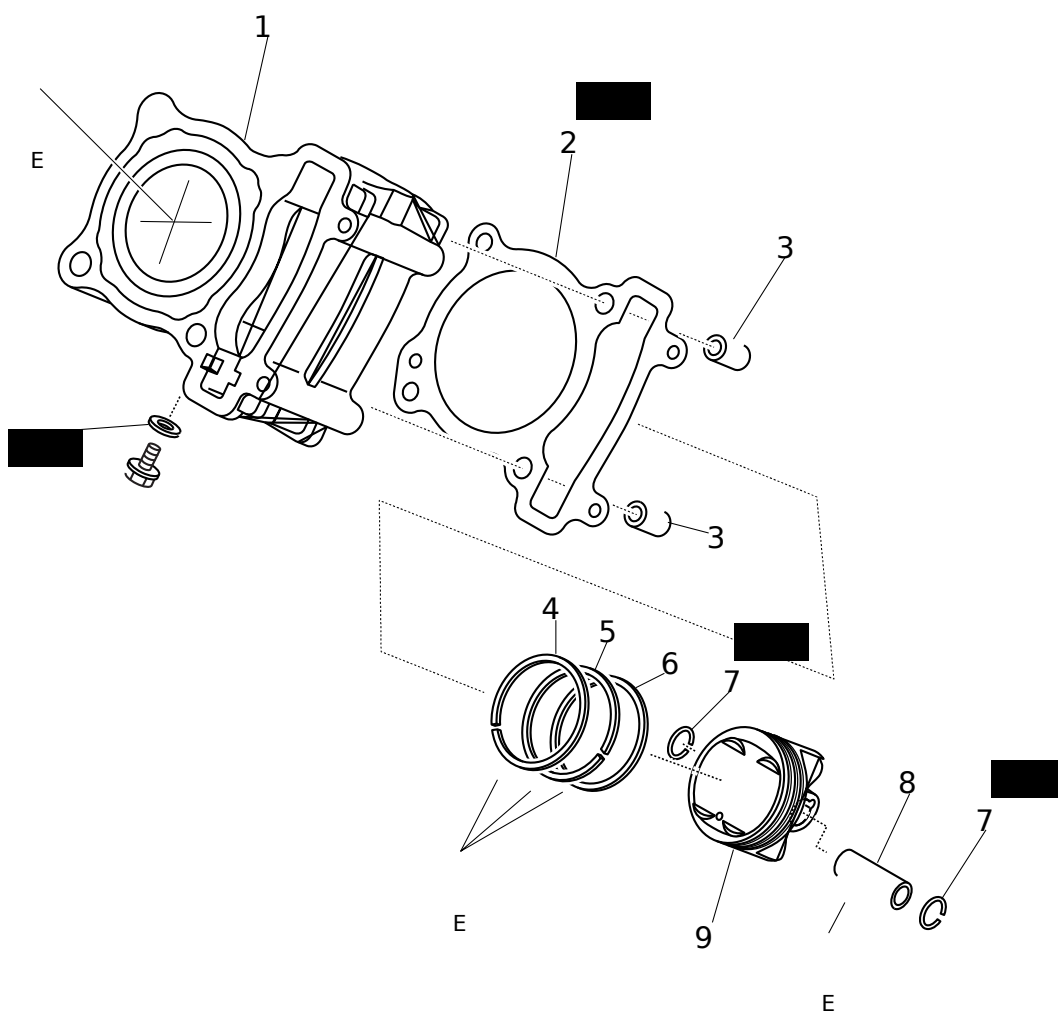
Hitting the valve tip with excessive force could damage the valve.

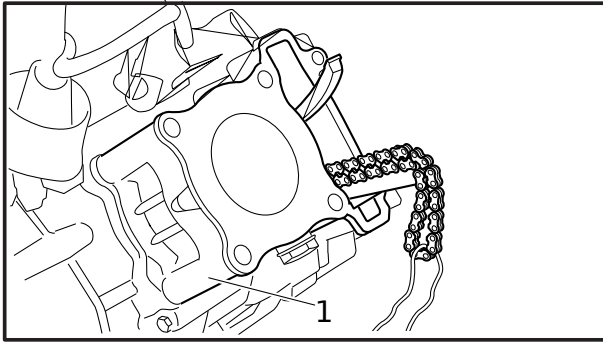
EASF0027

CYLINDER AND PISTON

- 1 Cylinder
- 2 Cylinder gasket
- 3 Dowel pin
- 4 Top ring
- 5 2nd ring
- 6 Oil ring
- 7 Piston pin clip

- 8 Piston pin
- 9 Piston





EASF0028

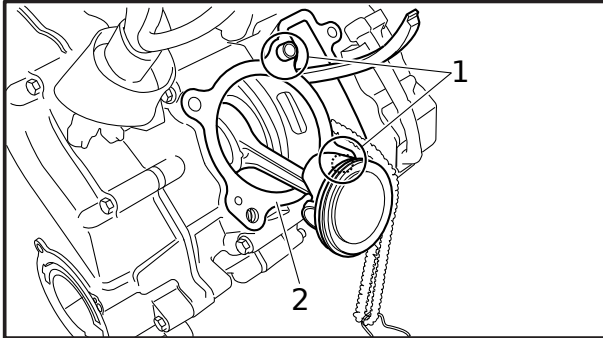
REMOVING THE CYLINDER AND PISTON

NOTE:

Prior to removing the cylinder and piston, remove the cylinder head.

1. Remove:
9cylinder 1

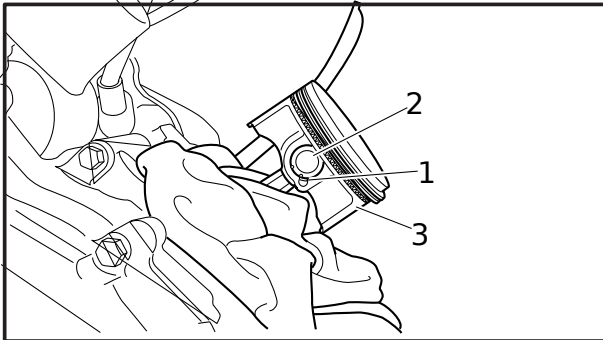
2. Remove:
9dowel pins 1
9gasket 2



3. Remove:
9piston pin clip 1
9piston pin 2
9piston 3

C

Do not use a hammer to drive the piston pin out.



NOTE:

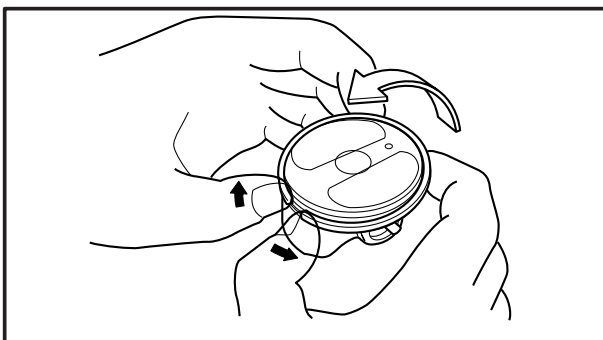
9Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.

9Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area of the piston. If both areas are deburred and the piston pin is still difficult to remove, remove it with a piston pin puller set.

4. Remove:
9top ring
92nd ring
9oil ring

NOTE:

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS00255

CHECKING THE CYLINDER AND PISTON

1. Check:

9piston surface

9cylinder wall

Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.

2. Measure:

9piston-to-cylinder clearance

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- a. Measure cylinder bore "C" with the cylinder bore gauge.

NOTE:

Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Cylinder bore "C"	54.000 – 54.010 mm (2.1260 – 2.1264 in)
Limit	54.100 mm (2.1299 in)
Taper limit "T"	0.05 mm (0.002 in)
Out-of-round "R"	0.05 mm (0.002 in)

"C" = maximum of D₁ – D₆**"T" = maximum of D₁ or D₂ – maximum of D₅ or D₆****"R" = maximum of D₁, D₃ or D₅ – minimum of D₂, D₄ or D₆**

- b. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter "P" with a micrometer.
- a 5 mm from the bottom edge of the piston

	Piston size "P"
Standard	53.962 – 53.985 mm (2.1245 – 2.1254 in)

- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
Cylinder bore "C" –
Piston skirt diameter "P"

Piston-to-cylinder clearance
0.0015 – 0.048 mm
(0.0006 – 0.0019 in)
<Limit>: 0.15 mm (0.0059)

- f. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.

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EAS00263

CHECKING THE PISTON RINGS

1. Measure:

9piston ring side clearance

Out of specification → Replace the piston and piston rings as a set.

NOTE:

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

Piston ring side clearance
Top ring
0.030 – 0.065 mm
(0.0012 – 0.0026 in)
<Limit>: 0.1 mm (0.0039 in)
2nd ring
0.020 – 0.055 mm
(0.0008 – 0.0022 in)
<Limit>: 0.1 mm (0.0039 in)

2. Install:

9piston ring
(into the cylinder)

NOTE:

Level the piston ring into the cylinder with the piston crown.

a 40 mm

3. Measure:

9piston ring end gap

Out of specification → Replace the piston ring.

NOTE:

The end gap of the oil ring expander cannot be measured. If the end gaps of the oil ring rails are excessive, replace all three piston rings.

Piston ring end gap**Top ring**

0.10 – 0.25 mm

(0.0039 – 0.0098 in)

<Limit>: 0.4 mm (0.0157 in)

2nd ring

0.10 – 0.25 mm

(0.0039 – 0.0098 in)

<Limit>: 0.4 mm (0.0157 in)

Oil ring rails

0.20 – 0.70 mm (0.01 – 0.03 in)

EAS00265

CHECKING THE PISTON PIN

1. Check:

9piston pin

Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.

2. Measure:

9piston pin outside diameter a

Out of specification → Replace the piston pin.

Piston pin outside diameter

13.995 – 14.000 mm

(0.5510 – 0.5512 in)

<Limit>: 13.975 mm (0.5502 in)

3. Measure:

9piston pin bore diameter (of the piston) b

Out of specification → Replace the piston.

Piston pin bore diameter (of the piston)

14.002 – 14.013 mm

(0.5513 – 0.5517 in)

<Limit>: 14.043 mm (0.5529 in)

4. Calculate:

9piston-pin-to-piston-pin-bore clearance

Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance =

Piston pin bore diameter b_b -

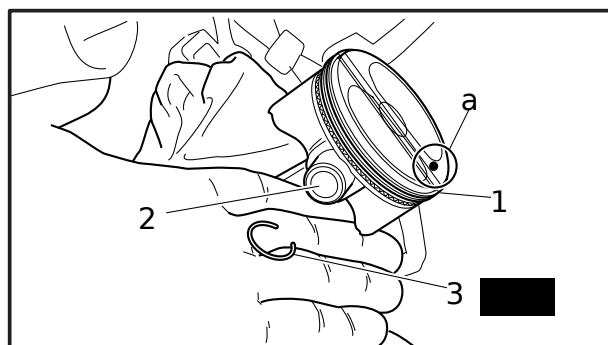
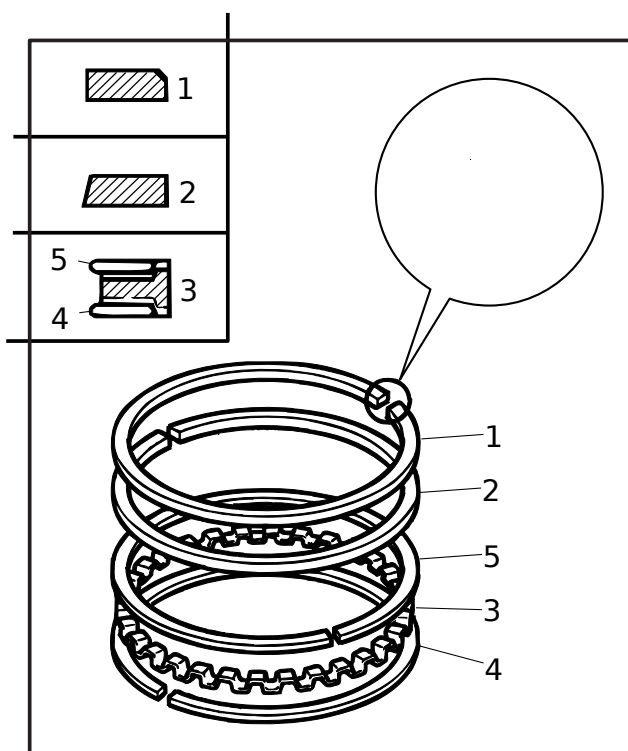
Piston pin outside diameter a_a

Piston-pin-to-piston-pin-bore clearance

0.002 – 0.018 mm

(0.0001 – 0.0007 in)

<Limit>: 0.068 mm (0.027 in)



EAS00267

INSTALLING THE PISTON AND CYLINDER

1. Install:

9top ring 1

92nd ring 2

9oil ring expander 3

9lower oil ring rail 4

9upper oil ring rail 5

NOTE:

Be sure to install the piston rings so that the manufacturer's marks or numbers face up.

2. Install:

9piston 1

9piston pin 2

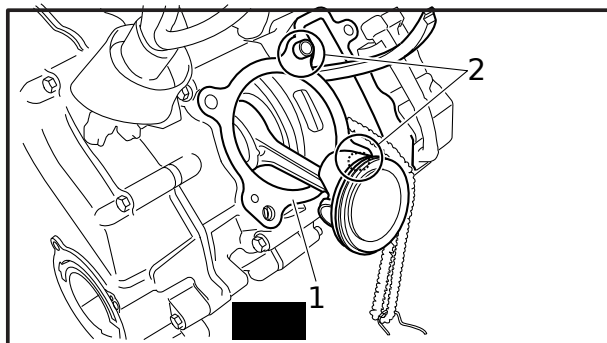
9piston pin clip 3

NOTE:

9Apply engine oil to the piston pin.

9Make sure the mark a on the piston points towards the exhaust side of the cylinder.

9Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.



3. Install:

9gasket 1

9dowel pins 2

4. Lubricate:

9piston

9piston rings

9cylinder

(with the recommended lubricant)

NOTE:

Be sure to apply enough engine oil onto them.

Recommended lubricant
Engine oil



5. Offset:

9piston ring end gaps

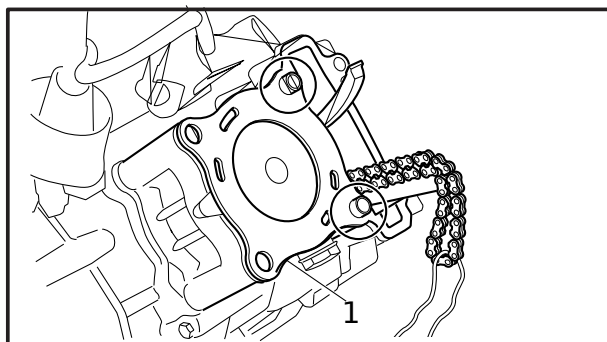
a Top ring

b Lower oil ring rail

c Upper oil ring rail

d 2nd ring

a forward



6. Install:

9cylinder 1

NOTE:

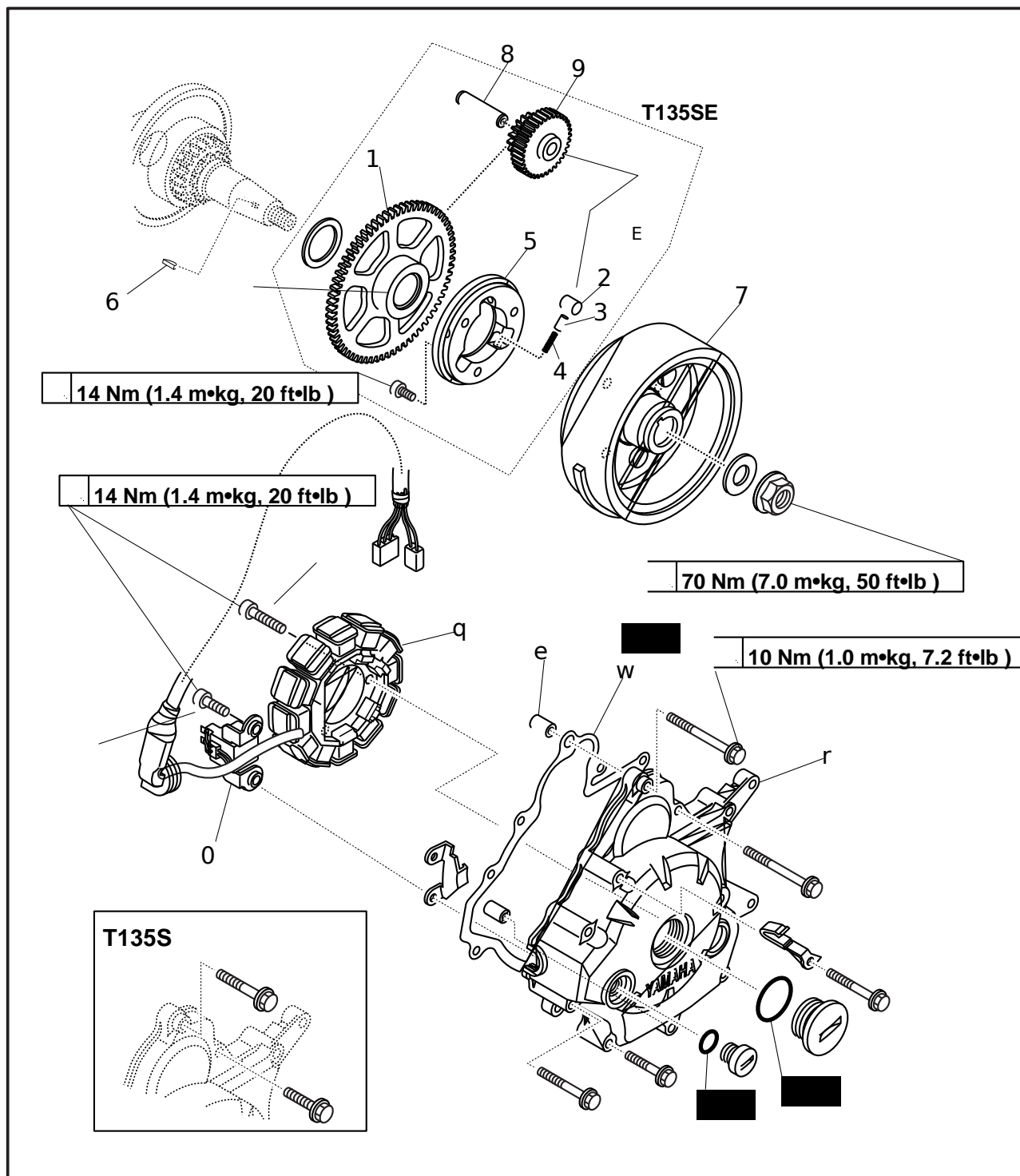
9While compressing the piston rings with one hand, install the cylinder with the other hand.

9Pass the timing chain and timing chain guide (intake side) through the timing chain cavity.

EASF0034

GENERATOR AND STARTER CLUTCH

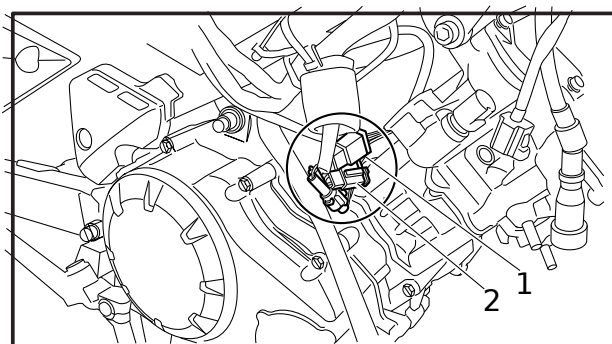
- | | |
|-----------------------------|----------------------------------|
| 1 Starter clutch gear | 8 Starter clutch idle gear shaft |
| 2 Starter clutch roller | 9 Starter clutch idle gear |
| 3 Starter clutch spring cap | 0 Pickup coil |
| 4 Starter clutch spring | q Stator coil |
| 5 Starter clutch | w Gasket |
| 6 Woodruff key | e Dowel pin |
| 7 Generator rotor | r Crankcase cover (left) |



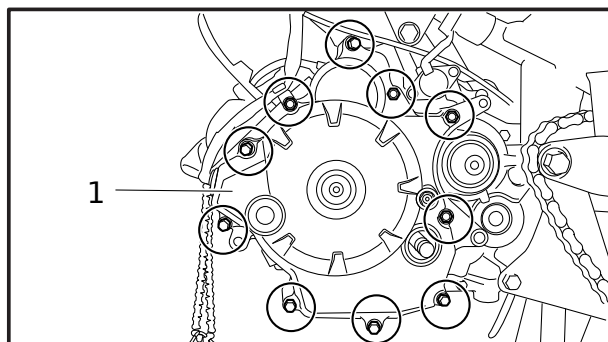
EAS00346

REMOVING THE GENERATOR

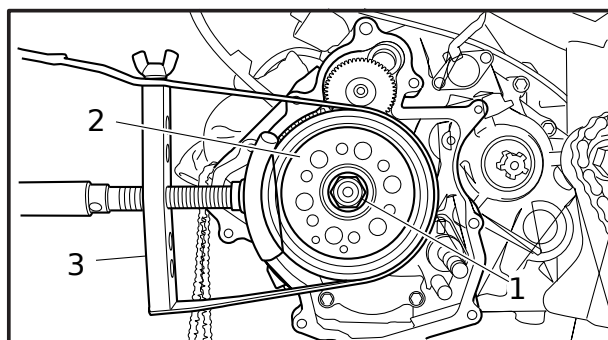
1. Drain:
 - 9engine oil
(completely from the crankcase)
Refer to "CHANGING THE ENGINE OIL" in chapter 3.
2. Remove:
 - 9side cowling (left)
Refer to "REMOVING THE SIDE COWLINGS" in chapter 3.
 - 9shift pedal
 - 9drive sprocket cover
Refer to "REMOVING THE DRIVE CHAIN AND SPROCKETS" in chapter 6.



3. Disconnect:
 - 9stator coil coupler 1
 - 9pickup coil coupler 2



4. Remove:
 - 9crankcase cover (left) 1
 - 9gasket
 - 9dowel pins

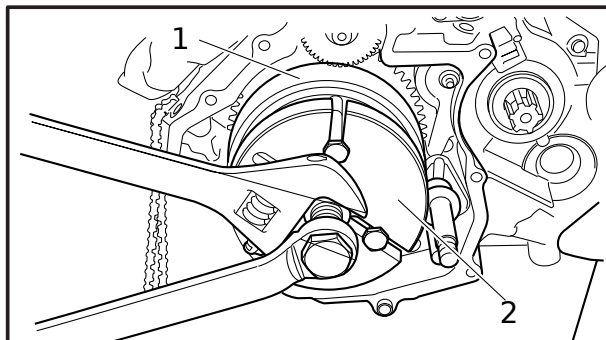


5. Remove:
 - 9generator rotor nut 1
 - 9washer

NOTE:

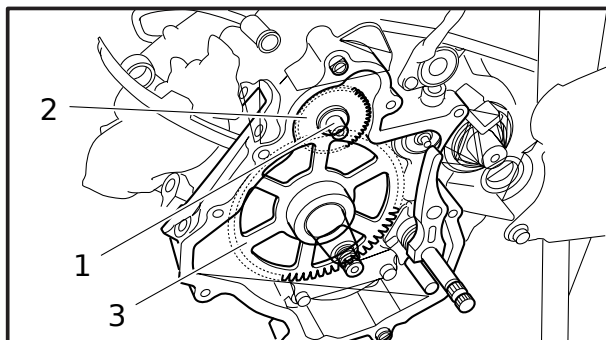
- 9While holding the generator rotor 2 with the sheave holder 3, loosen the generator rotor nut.
- 9Do not allow the sheave holder to touch the projection on the generator rotor.

Sheave holder
90890-01701



6. Remove:
- 9generator rotor 1
 - (with the flywheel puller 2)
 - 9woodruff key

Flywheel puller
90890-01362



EAS00344

REMOVING THE STARTER CLUTCH (T135SE)

1. Remove:
- 9starter clutch idle gear shaft 1
 - 9starter clutch idle gear 2
 - 9starter clutch gear 3
 - 9washer

2. Remove:
- 9starter clutch rollers 1
 - 9starter clutch spring caps
 - 9starter clutch springs

3. Remove:
- 9starter clutch bolt
 - 9starter clutch 1

NOTE:

9While holding the generator rotor 2 with the sheave holder, remove the starter clutch bolt.
9Do not allow the sheave holder to touch the projection on the generator rotor.

Sheave holder
90890-01701

EAS00351

CHECKING THE STARTER CLUTCH (T135SE)

1. Check:

9starter clutch rollers 1

Damage/wear → Replace.

2. Check:

9starter clutch idle gear 1

9starter clutch gear 2

Burr/chips/roughness/wear → Replace the defective part(s).

3. Check:



9starter clutch gear contacting surfaces a

Damage/pitting/wear → Replace the starter clutch gear.

4. Check:

9starter clutch operation

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- Install the starter clutch gear 1 onto the starter clutch and hold the starter clutch.
- When turning the starter clutch gear clockwise , the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
- When turning the starter clutch gear counterclockwise , it should turn freely, otherwise the starter clutch is faulty and must be replaced.

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EAS00355

INSTALLING THE STARTER CLUTCH (T135SE)

1. Install:

9starter clutch 1

14 Nm (1.4 m•kg, 10 ft•lb)**NOTE:**

9While holding the generator rotor 2 with the sheave holder, tighten the starter clutch bolt.

9Do not allow the sheave holder to touch the projection on the generator rotor.

9Lock the threads on the starter clutch bolts by staking them with a center punch.

Sheave holder
90890-01701

EAS00353

INSTALLING THE GENERATOR

1. Install:

9woodruff key

9generator rotor

9generator rotor nut

NOTE:

9Clean the tapered portion of the crankshaft and the generator rotor hub.

9When installing the generator rotor, make sure the woodruff key is properly sealed in the key-way of the crankshaft.

2. Tighten:

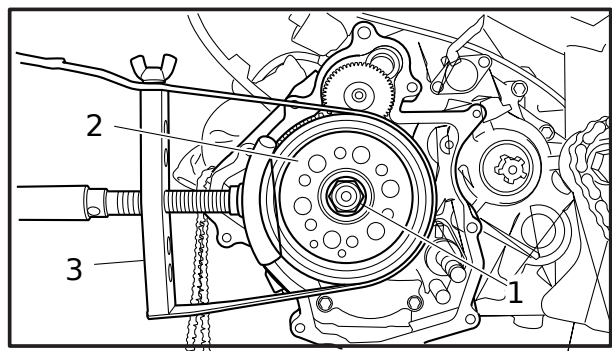
9generator rotor nut 1

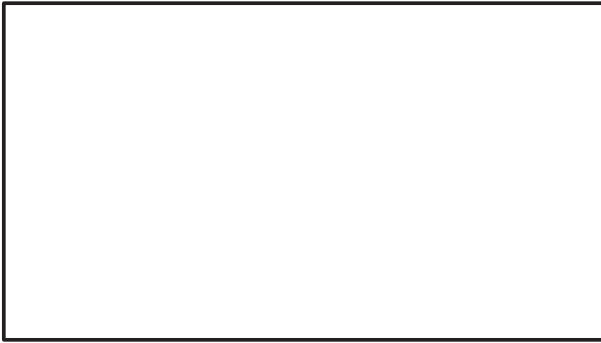
70 Nm (7.0 m•kg, 50 ft•lb)**NOTE:**

9While holding the generator rotor 2 with the sheave holder 3, tighten the generator rotor nut.

9Do not allow the sheave holder to touch the projection on the generator rotor.

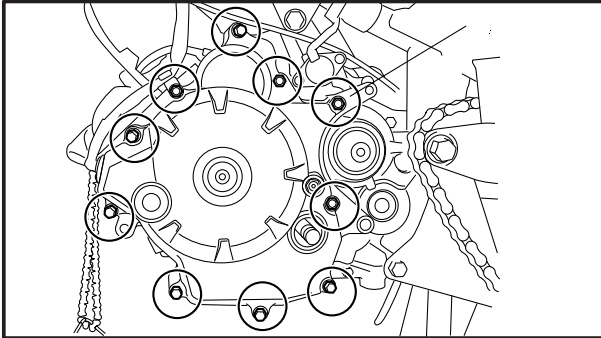
Sheave holder
90890-01701





3. Apply:
 - 9sealant
 - (on to the generator lead grommet)

<p>Yamaha bond No. 1215 90890-85505</p>



4. Apply:
 - 9sealant

NOTE:

Be sure to apply the sealant onto the crankcase cover bolt thread as shown one.

<p>Yamaha bond No. 1215 90890-85505</p>

5. Install:
 - 9gasket
 - 9crankcase cover

<p>10 Nm (1.0 m•kg, 7.2 ft•lb)</p>

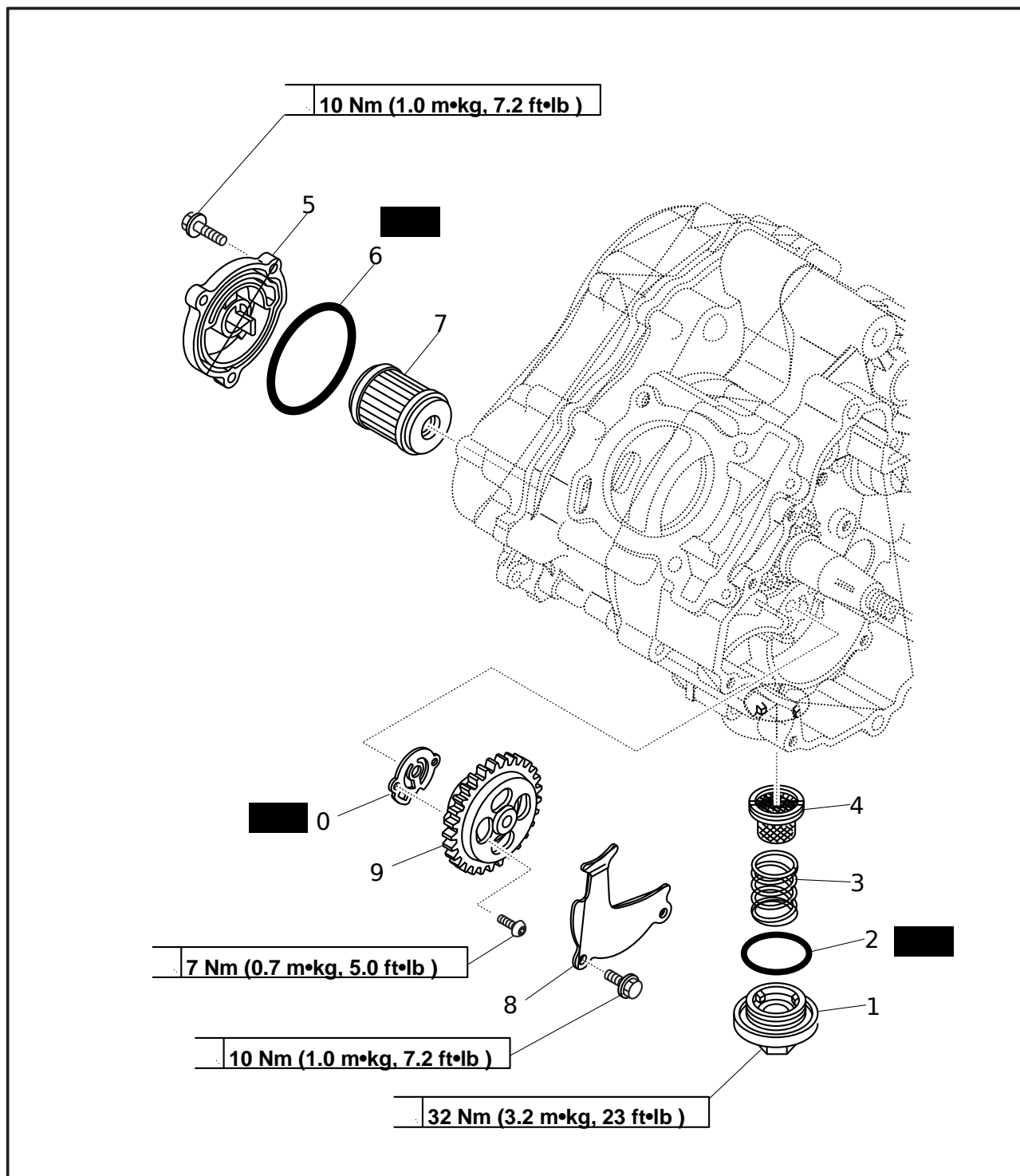
EASF0035

OILPUMP



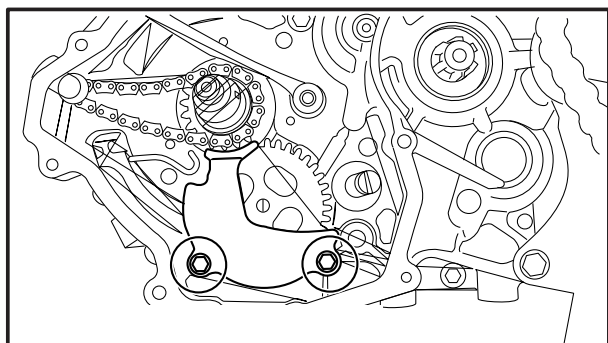
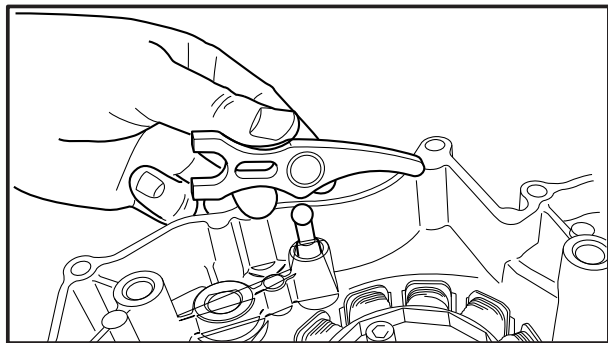
- 1 Oil drain bolt
- 2 O-ring
- 3 Spring
- 4 Oil strainer
- 5 Oil filter cover
- 6 O-ring
- 7 Oil filter

- 8 Gear cover
- 9 Oil pump assembly
- 0 Gasket

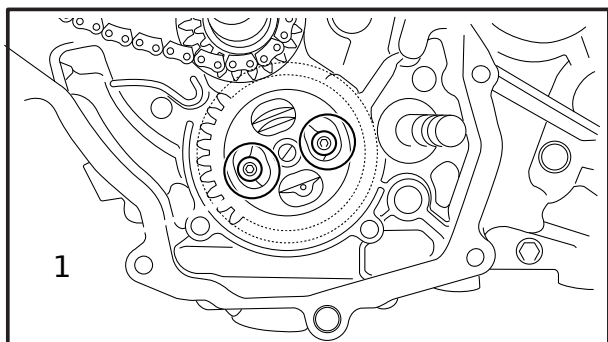


REMOVING THE OILPUMP

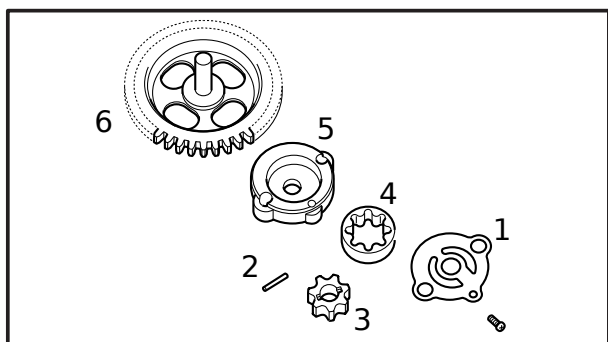
1. Drain:
 - 9engine oil
(completely from the crankcase)
Refer to "CHANGING THE ENGINE OIL" in chapter 3.
2. Remove:
 - 9generator
Refer to "GENERATOR AND STARTER CLUTCH".
3. Remove:
 - 9clutch release shift arm



4. Remove:
 - 9gear cover



5. Remove:
 - 9oil pump assembly 1
 - 9gasket

**DISASSEMBLING THE OILPUMP**

1. Remove:
 - 9screw
 - 9pump cover 1
 - 9pin 2
 - 9inner rotor 3
 - 9outer rotor 4
 - 9oil pump housing 5
 - 9oil pump driven cover 6

EAS00364

CHECKING THE OILPUMP

1. Check:

9oil pump driven gear 1

9oil pump housing 2

9outer rotor

9inner rotor

Cracks/damage/wear → Replace the defective part(s).

2. Measure:

9inner-rotor-to-outer-rotor-tip clearance a

9outer-rotor-to-oil-pump-housing clearance b

b

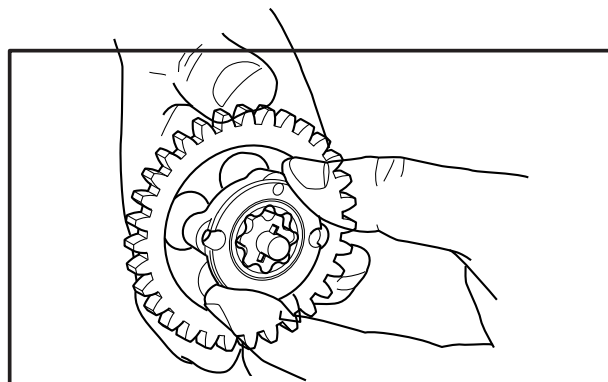
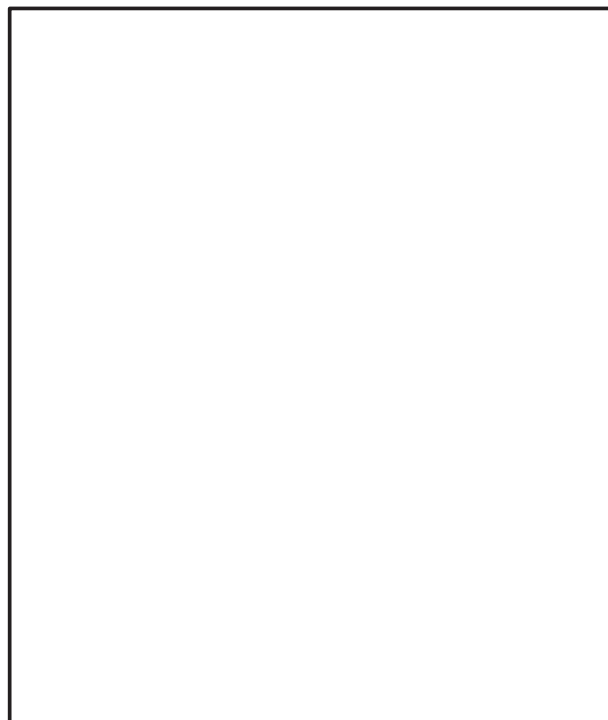
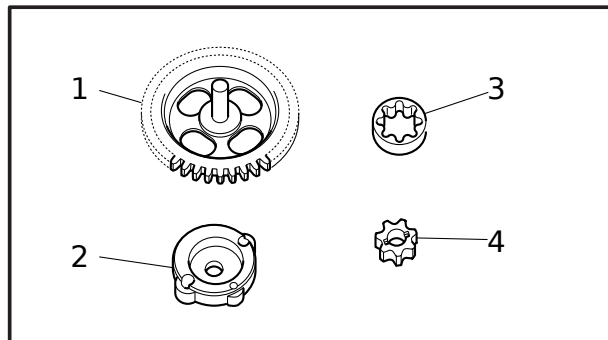
9oil-pump-housing-to-inner-rotor-and-outer-rotor clearance c

Out of specification → Replace the oil pump.

1 Inner rotor

2 Outer rotor

3 Oil pump housing

Inner-rotor-to-outer-rotor-tip clearance**0.15 mm (0.0059 in)****<Limit>: 0.20 mm (0.0079 in)****Outer-rotor-to-oil-pump-housing clearance****0.06 – 0.11 mm****(0.0024 – 0.0043 in)****<Limit>: 0.15 mm (0.0059 in)****Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance****0.06 – 0.11 mm****(0.0024 – 0.0043 in)****<Limit>: 0.15 mm (0.0059 in)**

3. Check:

9oil pump operation

Rough movement → Repeat steps (1) and (2) or replace the defective part(s).

EAS00375

ASSEMBLING THE OILPUMP

1. Lubricate:

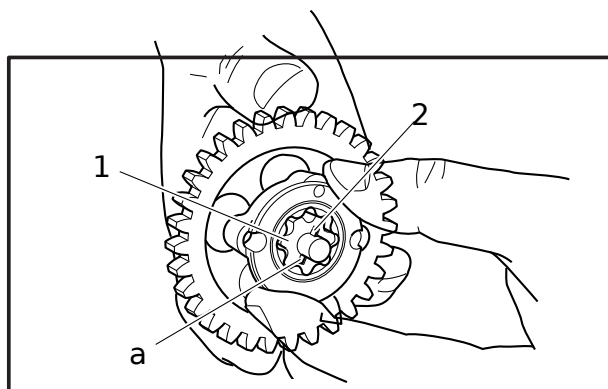
9inner rotor

9outer rotor

9oil pump shaft

(with the recommended lubricant)

Recommended lubricant
Engine oil



2. Install:

9oil pump shaft

(to the oil pump housing)

9inner rotor 1

9outer rotor

9pin 2

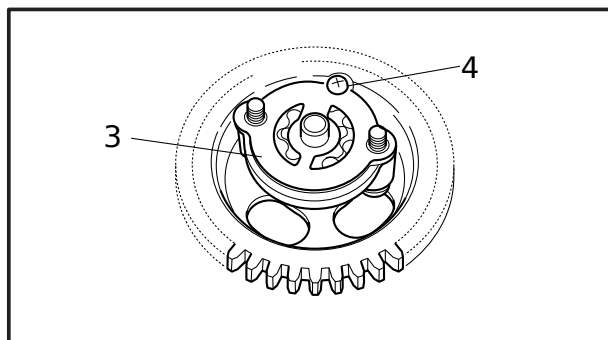
9oil pump housing cover 3

9screw 4

1 Nm (0.1 m•kg, 0.7 ft•lb)

NOTE:

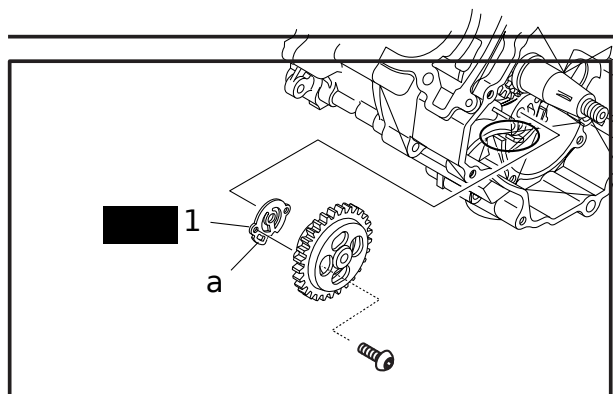
When installing the inner rotor, align the pin in the oil pump shaft with the groove a in the inner rotor.



3. Check:

9oil pump operation

Refer to "CHECKING THE OILPUMP".



EAS00376

INSTALLING THE OILPUMP

1. Install:

9gasket 1

9oil pump assembly

7 Nm (0.7 m•kg, 5.0 ft•lb)**NOTE:**

Install the gasket with section a in the position as shown in the illustration.

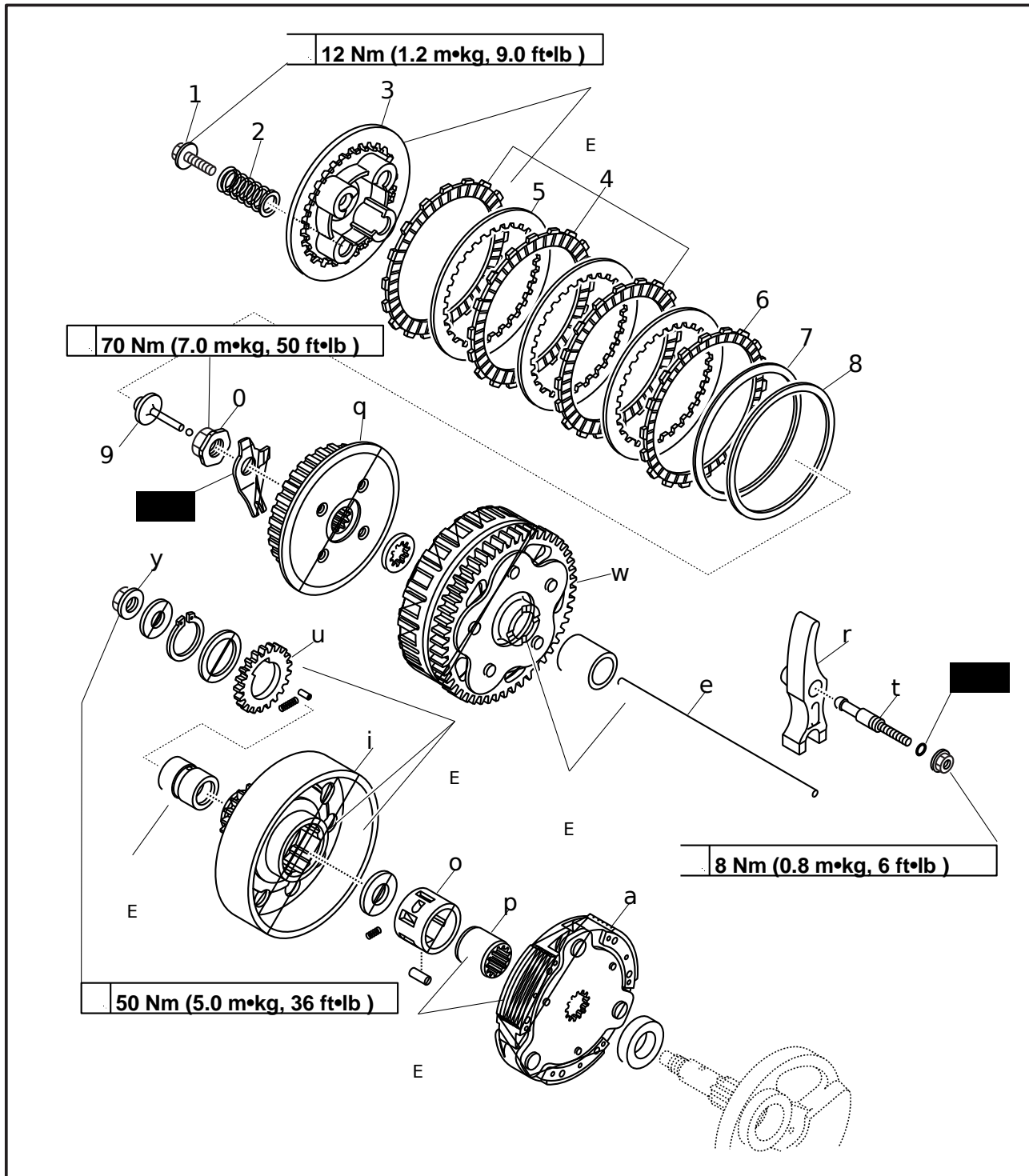
cC

After tightening the bolts, make sure the oil pump turns smoothly.

EASF0029

CLUTCH

- | | | |
|------------------------------|----------------------------------|----------------------------|
| 1 Clutch pressure plate bolt | 9 Clutch push rod #1 | y Clutch shoe housing nut |
| 2 Clutch spring | 0 Clutch boss nut | u Primary drive gear |
| 3 Clutch pressure plate | q Clutch boss | i Clutch shoe housing |
| 4 Friction plate #1 | w Clutch housing | o Cage |
| 5 Clutch plate | e Clutch push rod #2 | p Clutch shoe housing boss |
| 6 Friction plate #2 | r Clutch release shift arm | a Clutch shoe |
| 7 Cushion ring | t Clutch release adjusting screw | |
| 8 Seat plate | | |



EAS00277

REMOVING THE CLUTCH**1. Drain:**

9engine oil

(completely from the crankcase)

Refer to "CHANGING THE ENGINE OIL" in chapter 3.

2. Remove:

9side cowlings (left and right)

Refer to "REMOVING THE SIDE COWLINGS" in chapter 3.

9muffler

9footrest

9brake pedal

Refer to "REMOVING THE ENGINE".

9kickstarter lever

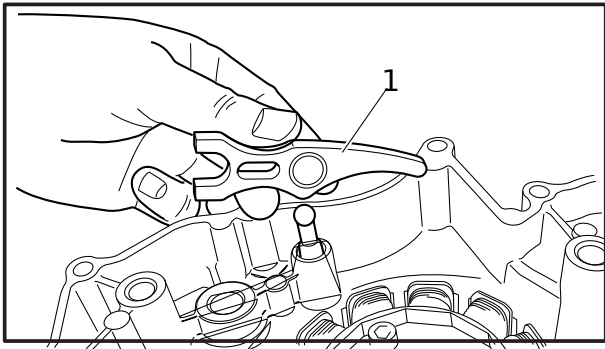
Refer to "KICKSTARTER".

9crankcase cover (left)

Refer to "GENERATOR AND STARTER CLUTCH".

3. Remove:

9clutch release shift arm 1

**4. Remove:**

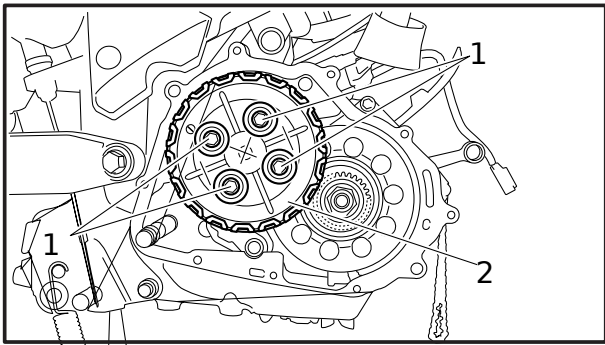
9crankcase cover (right)

5. Remove:

9clutch pressure plate bolts 1

9clutch springs

9clutch pressure plate 2

**NOTE:**

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

6. Remove:

9clutch push rod #1 1

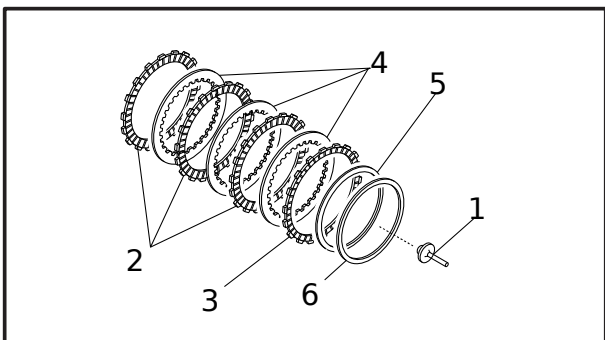
9friction plates #1 2

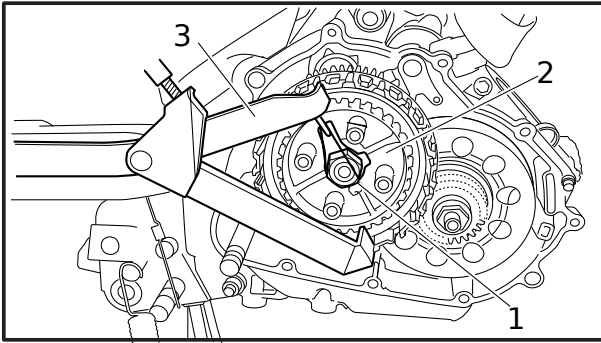
9friction plates #2 3

9clutch plate 4

9cushion ring 5

9seat plate 6





7. Straighten the lock washer tab.

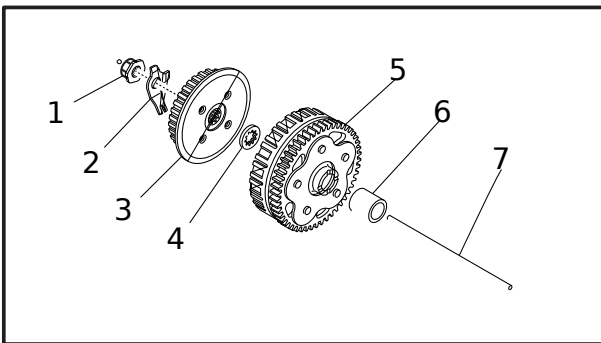
8. Loosen:

9clutch boss nut 1

NOTE:

While holding the clutch boss 2 with the universal clutch holder 3, loosen the clutch boss nut.

Universal clutch holder
90890-04086



9. Remove:

9clutch boss nut 1

9lock washer 2

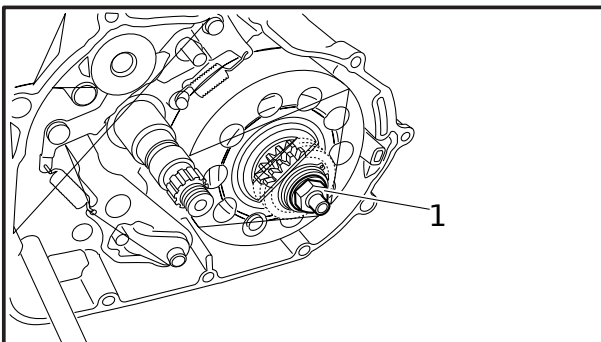
9clutch boss 3

9washer 4

9clutch housing 5

9spacer 6

9clutch push rod #2 7



10. Remove:

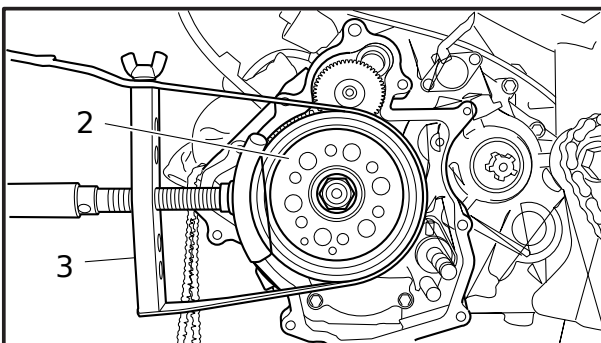
9clutch shoe housing nut 1

9washer

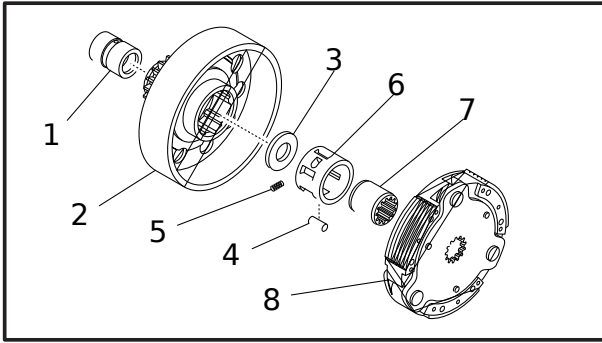
NOTE:

9Loosen the clutch shoe housing nut while holding the generator rotor 2 with the sheave holder 3.

9Do not allow the sheave holder to touch the projection on the generator rotor.



Sheave holder
90890-01701



11. Remove:
- 9collar 1
 - 9clutch shoe housing 2
 - 9washer 3
 - 9rollers 4
 - 9cage springs 5
 - 9cage 6
 - 9clutch shoe housing boss 7
 - 9clutch shoe 8

EAS00280

CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

1. Check:
 - 9friction plate
 - Damage/wear → Replace the friction plates as a set.
2. Measure:
 - 9friction plate thickness
 - Out of specification → Replace the friction plates as a set.

NOTE:

Measure the friction plate at four places.

Friction plate thickness

2.5 – 2.7 mm (0.010 – 0.11 in)

<Limit>: 2.4 mm (0.0945 in)

EAS00281

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:
 - 9clutch plate
 - Damage → Replace the clutch plates as a set.
2. Measure:
 - 9clutch plate warpage
 - (with a surface plate and thickness gauge 1)
 - Out of specification → Replace the clutch plates as a set.

Clutch plate warpage limit

0.05 mm (0.0020 in)



EAS00282

CHECKING THE CLUTCH SPRINGS

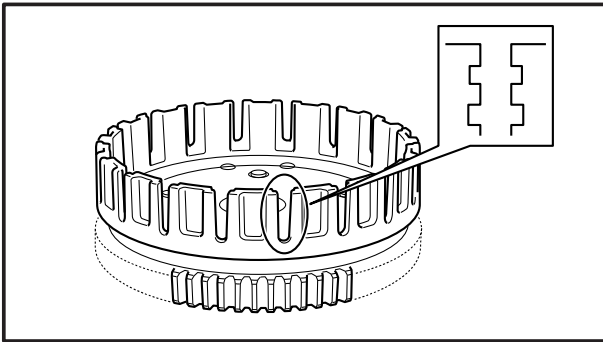
The following procedure applies to all of the clutch springs.

1. Check:
 - 9clutch spring
 - Damage → Replace the clutch springs as a set.
2. Measure:
 - 9clutch spring free length a
 - Out of specification → Replace the clutch springs as a set.

	Clutch spring free length
--	----------------------------------

	40.5 mm (1.59 in)
--	--------------------------

	<Limit>: 38.5 mm (1.52 in)
--	---



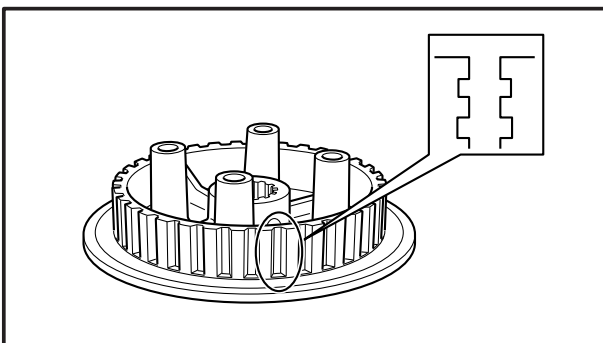
EAS00284

CHECKING THE CLUTCH HOUSING

1. Check:
 - 9clutch housing dogs
 - Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

NOTE:

Pitting on the clutch housing dogs will cause erratic clutch operation.



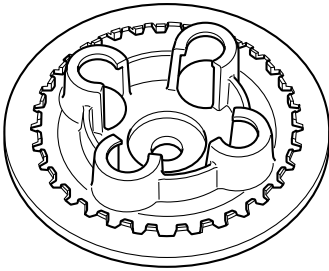
EAS00285

CHECKING THE CLUTCH BOSS

1. Check:
 - 9clutch boss splines
 - Damage/pitting/wear → Replace the clutch boss.

NOTE:

Pitting on the clutch boss splines will cause erratic clutch operation.



EAS00286

CHECKING THE CLUTCH PRESSURE PLATE

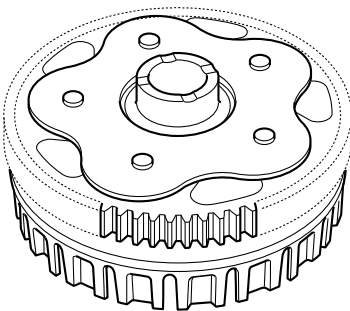
1. Check:
 - 9clutch pressure plate
 - Cracks/damage → Replace.

EAS00288

CHECKING THE CLUTCH PUSH RODS

1. Check:
 - 9clutch push rod #1
 - Cracks/damage/wear → Replace the clutch push rod #1.
 - 9clutch push rod #2
 - Cracks/damage/wear → Replace the clutch push rod #2.
2. Measure:
 - 9clutch push rods bending limit
 - Out of specification → Replace the clutch push rod.

	Clutch push rods bending limit 0.5 mm (0.0197 in)
--	--



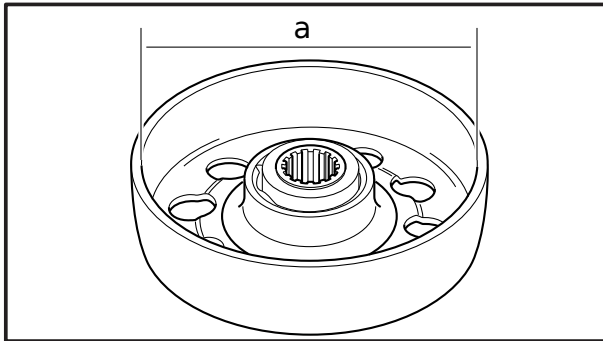
EAS00292

CHECKING THE PRIMARYDRIVEN GEAR

1. Check:
 - 9primary drive gear
 - (on the clutch shoe housing)
 - 9primary driven gear
 - (on the clutch housing)
 - Damage/wear → Replace the clutch shoe housing and clutch housing as a set.
 - Excessive noise during operation →
 - Replace the clutch shoe housing and clutch housing as a set.

CHECKING THE CLUTCH SHOE HOUSING

1. Check:
 - 9clutch shoe housing
 - Damage/wear → Replace.



2. Measure:
 - 9clutch shoe housing inside diameter a
 - Out of specification → Replace.

Clutch shoe housing inside diameter

116 mm (4.57 in)

<Limit>: 117 mm (4.61 in)

CHECKING THE CLUTCH SHOE

1. Check:
 - 9clutch shoe
 - Scratches → Smooth using coarse sandpaper.
 - Damage/wear → Replace.

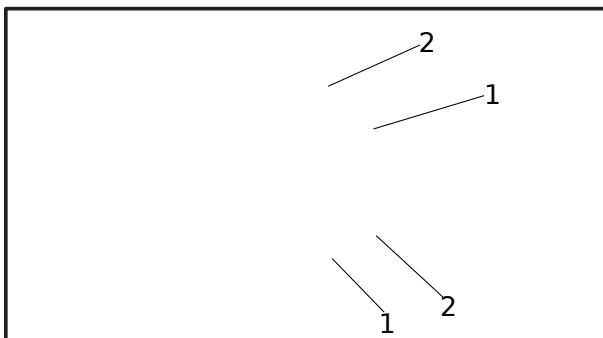


2. Measure:
 - 9clutch shoe groove depth a
 - Groove is worn away → Replace.

Clutch shoe groove depth

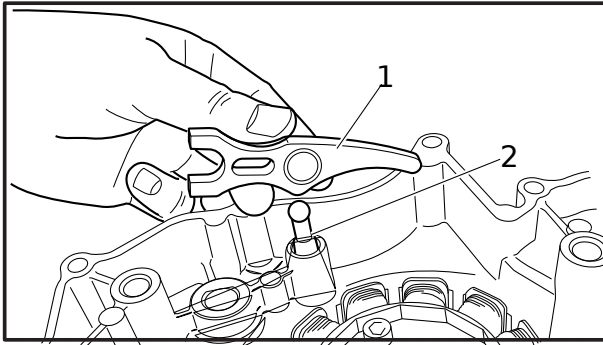
1.0 mm (0.04 in)

<Limit>: 0.1 mm (0.004 in)



CHECKING THE CAGE

1. Check:
 - 9cage 1
 - Damage/wear/cracks → Replace.
 - 9rollers 2
 - Wear/bend → Replace.
 - 9cage springs 3
 - Wear → Replace.



CHECKING THE CLUTCH RELEASE SHIFT ARM

1. Check:
 - 9clutch release shift arm 1
Damage/wear → Replace.
 - 9clutch release adjusting screw 2
Damage/wear → Replace.

EAS00293

INSTALLING THE CLUTCH

1. Install:
 - 9washer
 - 9cage 1
 - 9cage springs 2
 - 9rollers 3
 - 9clutch shoe housing boss 4

NOTE:

After installing the cage 1, cage springs 2 and rollers 3, check that they are in the right position to turn in the lateral direction. And then take care comes off to install them onto the crankshaft.

2. Tighten:
 - 9clutch shoe housing nut 1

50 Nm (5.0 m•kg, 30 ft•lb)

NOTE:

9While holding the generator rotor 2 with the sheave holder 3, tighten the clutch shoe housing nut.

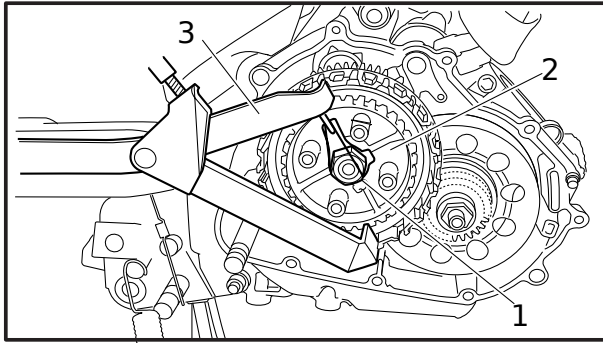
9Do not allow the sheave holder to touch the projection on the generator rotor.

Sheave holder 90890-01701

3. Install:
 - 9clutch push rod #2 1
 - 9spacer 2
 - 9clutch housing 3
 - 9washer 4
 - 9clutch boss 5
 - 9lock washer 6
 - 9clutch boss nut 7

NOTE:

Face the press dropped side toward the clutch housing, and then install the washer 4.



4. Tighten:
 9clutch boss nut 1

70 Nm (7.0 m•kg, 50 ft•lb)

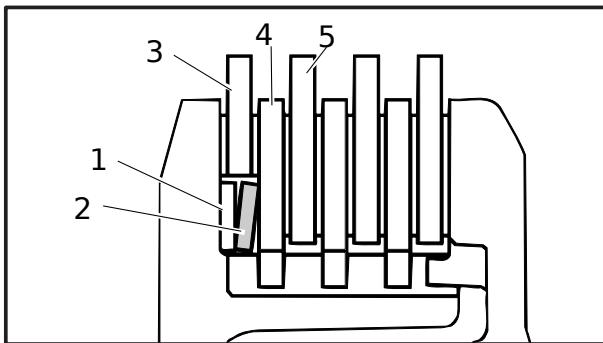
NOTE:

While holding the clutch boss 2 with the universal clutch holder 3, tighten the clutch boss nut.

**Universal clutch holder
 90890-04086**

5. Bend the lock washer tab along a flat side of the nut.
 6. Lubricate:
 9seat plate
 9cushion ring
 9friction plates #1
 9friction plate #2
 9clutch plates
 (with the recommended lubricant)

**Recommended lubricant
 Engine oil**

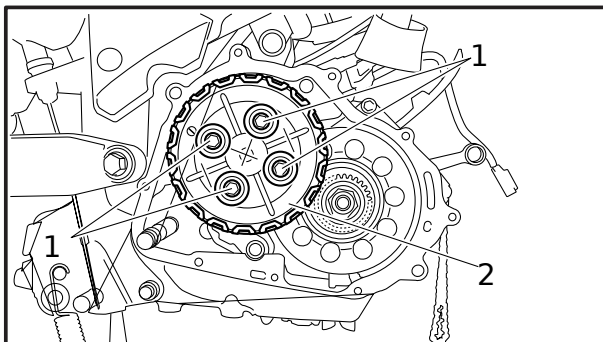


7. Install:
 9seat plate 1
 9cushion ring 2
 9friction plate #2 3
 9clutch plates 4
 9friction plates #1 5

NOTE:

9Make sure to face the cushion ring 2 toward as shown illustration, and then install it onto the clutch boss.

9First, install the seat plate, cushion ring and then alternate between a clutch plate and a friction plate.



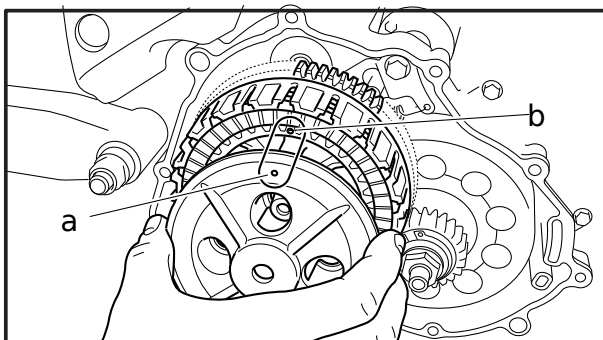
8. Install:
 9clutch springs
 9clutch pressure plate 1
 9clutch pressure plate bolts 2

12 Nm (1.2 m•kg, 9.0 ft•lb)

NOTE:

9Align the punch mark a on the pressure plate with clutch housing mark b.

9Tighten the clutch pressure plate bolts in stages and in a crisscross pattern.



9. Adjust:
 9clutch release system
 Refer to "ADJUSTING THE CLUTCH RELEASE SYSTEM" in chapter 3.

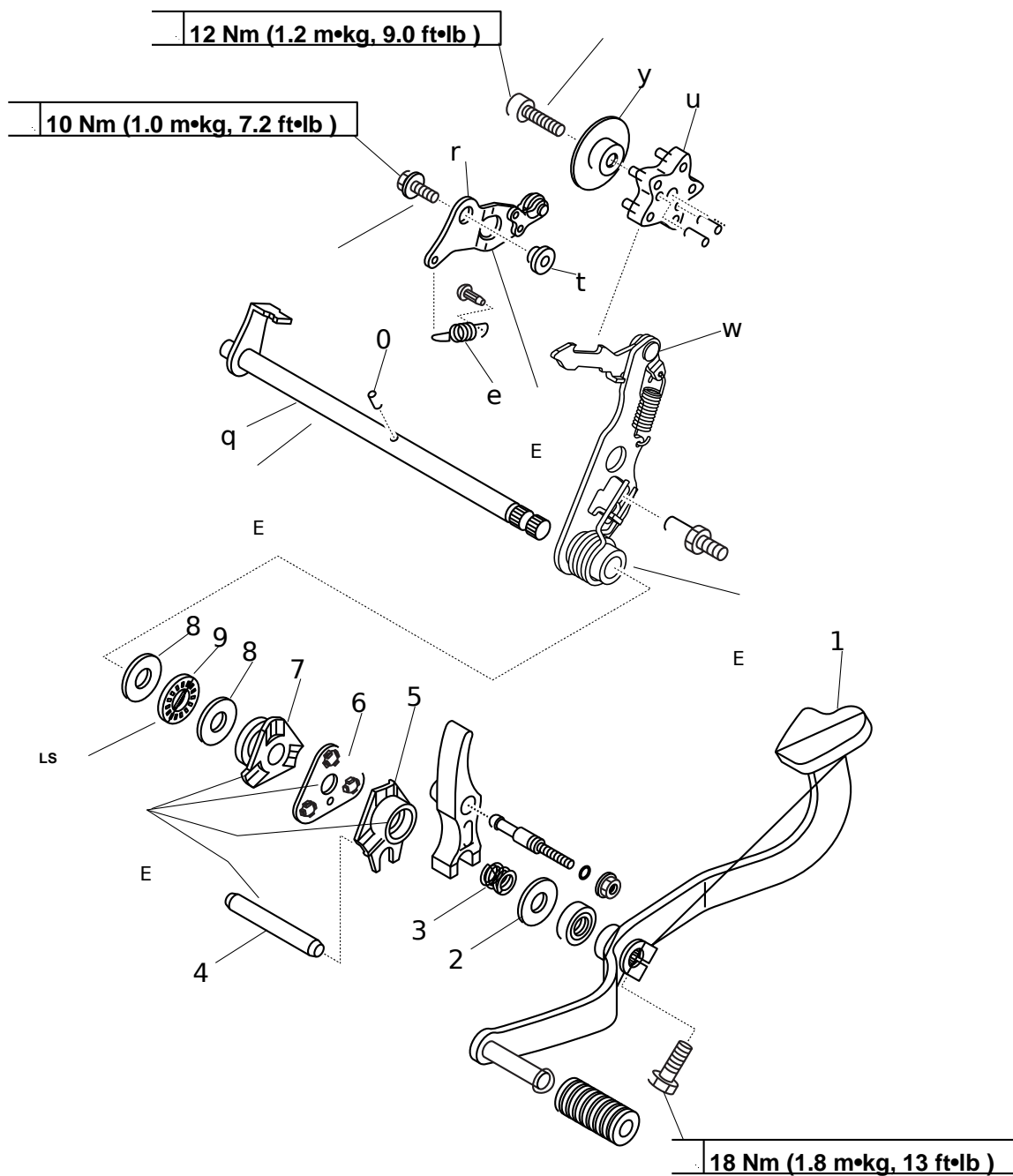
EASF0032

SHIFT SHAFT

- 1 Shift pedal
- 2 Washer
- 3 Spring
- 4 Shift fork guide bar
- 5 Shift guide
- 6 Pawl holder
- 7 Guide

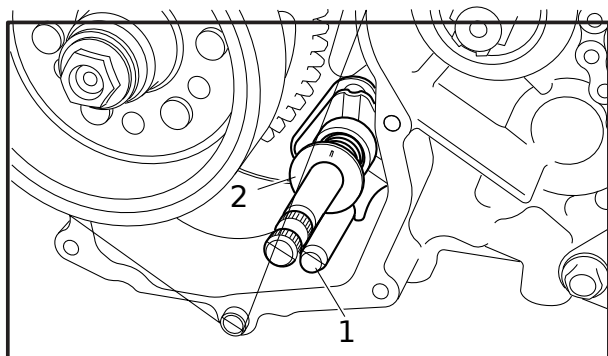
- 8 Washer
- 9 Thrust bearing
- 0 Dowel pin
- q Shift shaft
- w Shift lever assembly
- e Stopper lever spring
- r Stopper lever assembly

- t Collar
- y Plate
- u Shift drum segment

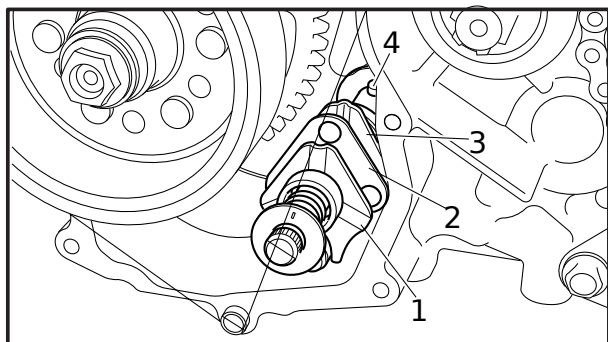


REMOVING THE SHIFT SHAFT

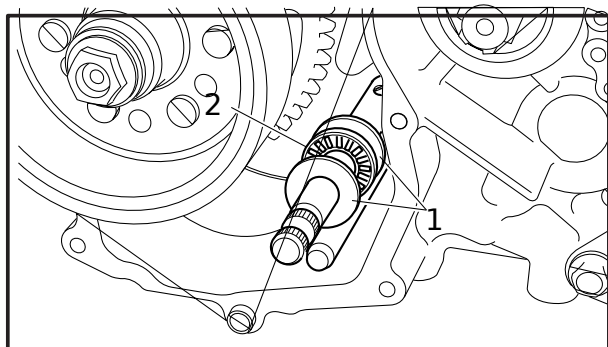
1. Drain:
 - 9engine oil
(completely from the crankcase)
Refer to "CHANGING THE ENGINE OIL" in chapter 3.
2. Remove:
 - 9clutch
Refer to "CLUTCH".
3. Remove:
 - 9shift pedal
 - 9crankcase cover bolts
 - 9crankcase cover (left)



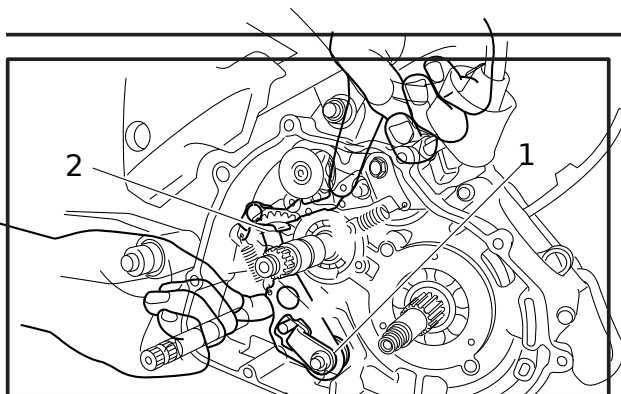
4. Remove:
 - 9shift fork guide bar 1
 - 9washer 2
 - 9shift guide spring



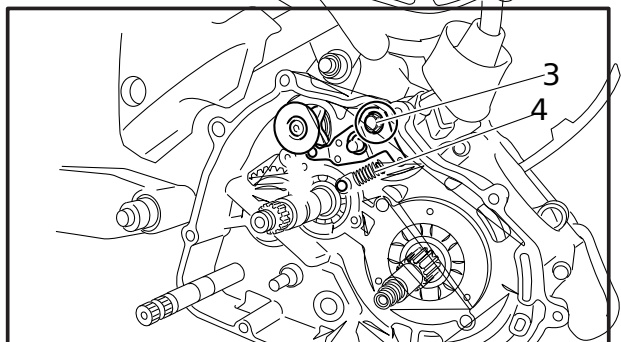
5. Remove:
 - 9shift guide 1
 - 9pawl holder 2
 - 9guide 3
 - 9dowel pin 4



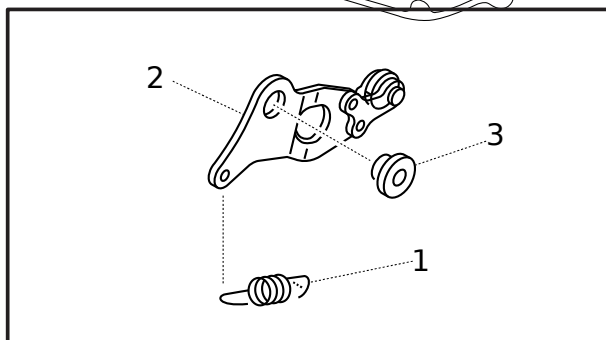
6. Remove:
 - 9washers 1
 - 9thrust bearing 2



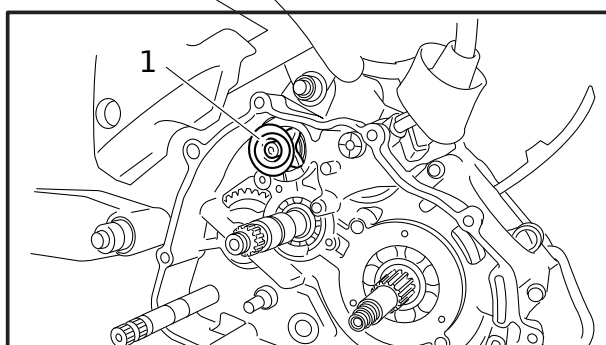
7. Remove:
9shift shaft assembly 1
9shift lever assembly 2



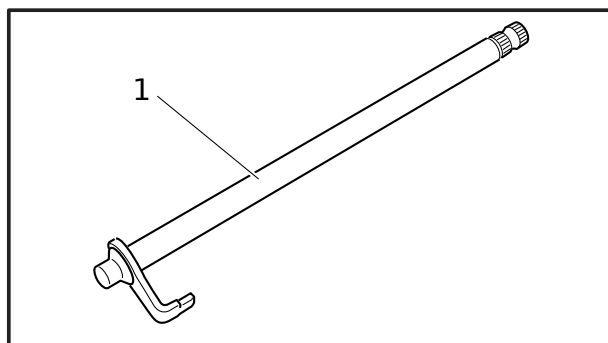
8. Remove:
9stopper lever assembly 3
9stopper lever spring 4
9collar



9. Remove:
9stopper lever spring 1
9stopper lever 2
9collar 3



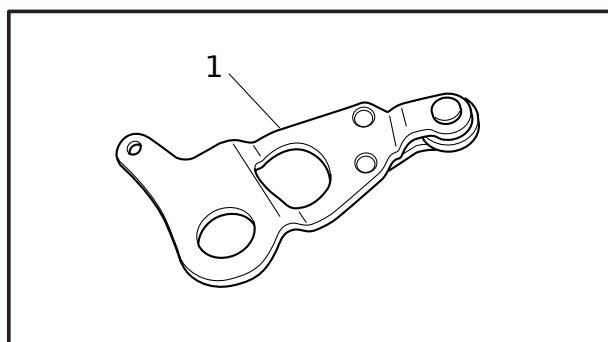
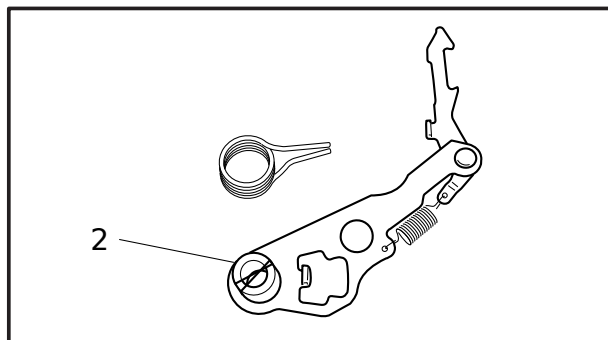
10. Remove:
9plate
9shift drum segment 1



EAS00328

CHECKING THE SHIFT SHAFT

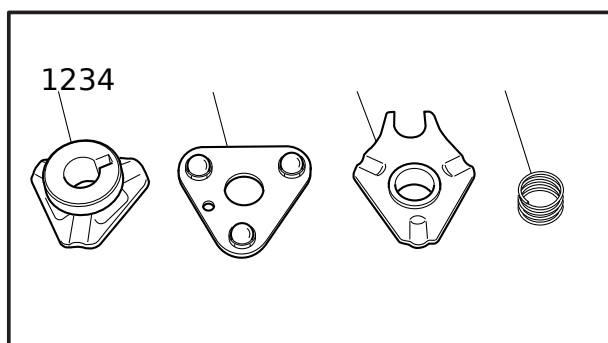
1. Check:
 - 9shift shaft 1
 - 9shift lever 2
 - Bends/damage/wear → Replace.
 - 9springs
 - Damage/wear → Replace.



EAS00330

CHECKING THE STOPPER LEVER

1. Check:
 - 9stopper lever 1
 - Bends/damage → Replace.
 - Roller turns roughly → Replace.
 - 9stopper lever spring
 - Damage/wear → Replace.

**CHECKING THE SHIFT GUIDE**

1. Check:
 - 9shift guide 1
 - 9pawl holder 2
 - 9guide 3
 - Bends/damage → Replace.
 - 9shift guide spring 4
 - Damage/wear → Replace.

CHECKING THE OILSEAL

1. Check:
 - 9oil seal
 - Damage/wear → Replace.

EAS00331

INSTALLING THE SHIFT SHAFT

1. Install:

9shift drum segment 1

9plate

12 Nm (1.2 m•kg, 9.0 ft•lb)

NOTE:

Apply locking agent (LOCTITE[®]) to the threads of shift drum segment screw.

2. Install:

9collar

9stopper lever 1^{LT}

9stopper lever spring 2

NOTE:

9Apply locking agent (LOCTITE[®]) to the stopper lever bolt.

9Hook the ends 3 of the stopper lever spring onto the stopper lever and the crankcase boss.

9Mesh the stopper lever with the shift drum segment assembly.

3. Install:

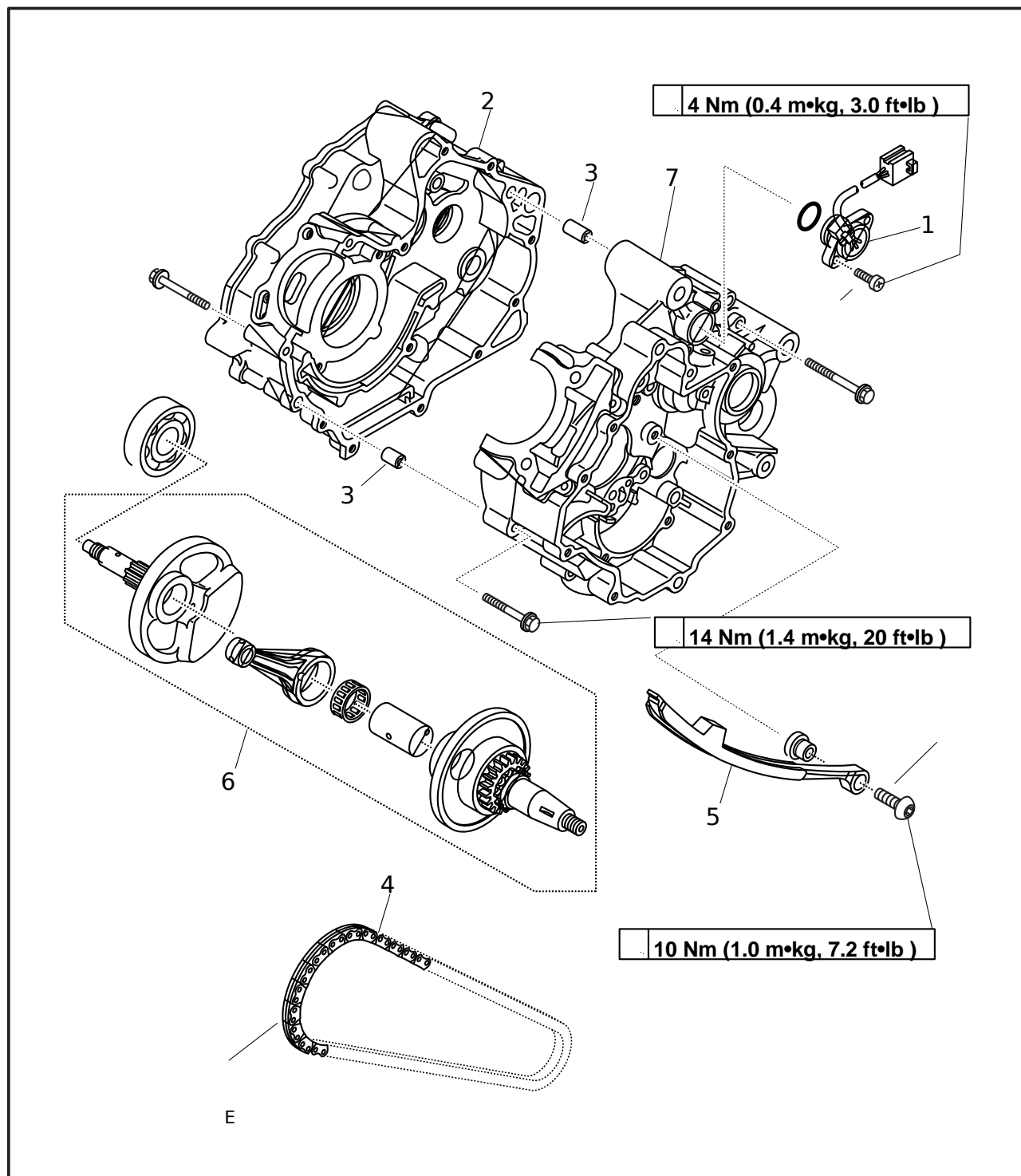
9shift lever assembly 1

9shift shaft assembly 2

EASF0037

CRANKCASE AND CRANKSHAFT

- 1 Neutral switch
- 2 Right crankcase
- 3 Dowel pin
- 4 Timing chain
- 5 Timing chain guide (intake side)
- 6 Crankshaft assembly
- 7 Left crankcase



EAS00385

DISASSEMBLING THE CRANKCASE**1. Remove:**

9engine

Refer to "REMOVING THE ENGINE".

2. Remove:

9starter motor lead (T135SE)

9starter motor (T135SE)

Refer to "STARTER MOTOR (T135SE)" in chapter 8.

3. Remove:

9cylinder head

Refer to "CYLINDER HEAD".

9cylinder

9piston

Refer to "CYLINDER AND PISTON".

9clutch

Refer to "CLUTCH".

9shift shaft

Refer to "SHIFTSHAFT".

9generator

9starter clutch

Refer to "GENERATOR AND STARTER CLUTCH".

9oil pump assembly

Refer to "OILPUMP".

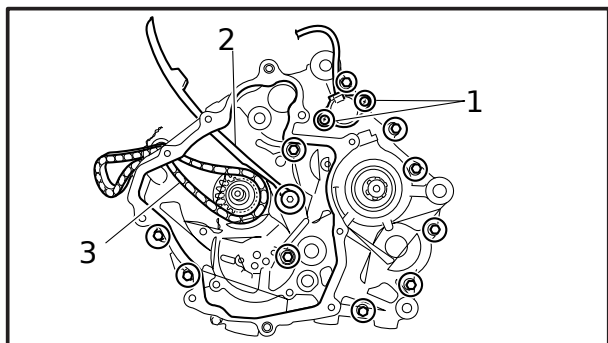
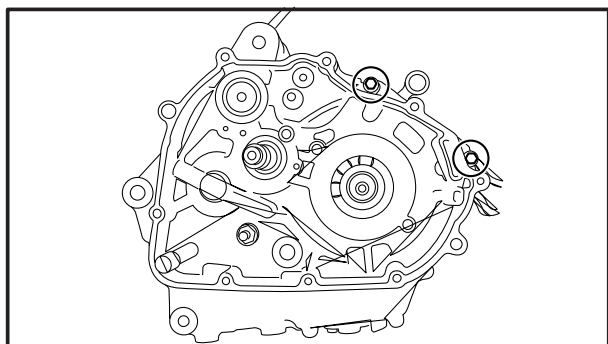
4. Remove:

9neutral switch 1

9timing chain guide (intake side) bolts

9timing chain guide (intake side) 2

9timing chain 3



5. Remove:

9crankcase bolts

NOTE:

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

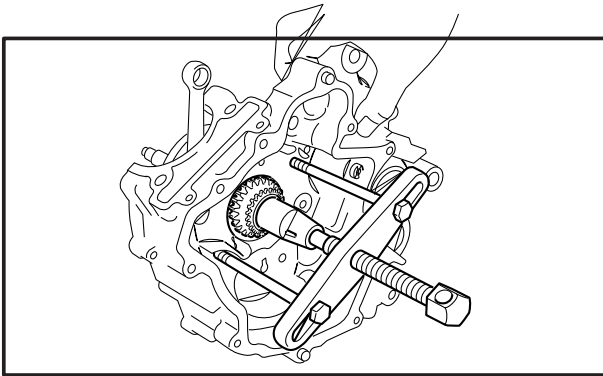
6. Remove:

9right crankcase

9dowel pins

C

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.



7. Remove:

9crankshaft assembly

NOTE:

Use the crankcase separating tool.

Crankcase separating tool: 90890-01135

W

Never use the hammer to tapping and removing the crankshaft directory.

EAS00394

CHECKING THE CRANKSHAFT AND CONNECTING ROD

1. Measure:

9crankshaft runout

Out of specification → Replace the crankshaft, bearing or both.

NOTE:

Turn the crankshaft slowly.

Maximum crankshaft runout 0.03 mm (0.0012 in)
--



2. Measure:

9big end side clearance

Out of specification → Replace the crankshaft.

	Big end side clearance
	0.11 – 0.41 mm
	(0.0043 – 0.0161 in)



3. Measure:

9crankshaft width

Out of specification → Replace the crankshaft.

	Crankshaft width
	45.95 – 46.00 mm
	(1.809 – 1.811 in)



4. Check:

9crankshaft sprocket 1

Damage/wear → Replace the crankshaft.

9bearing 2

Cracks/damage/wear → Replace the crankshaft.

5. Check:

9crankshaft journal

Scratches/wear → Replace the crankshaft.

EAS00399

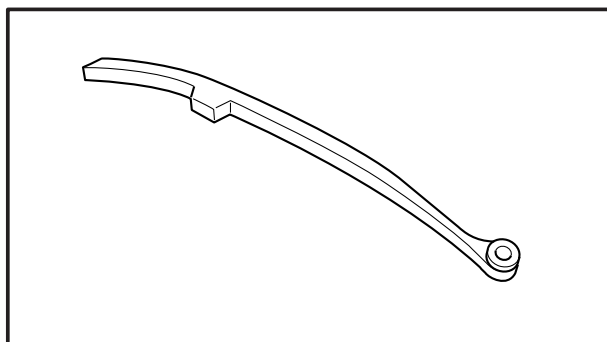
CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
 - 9crankcase
Cracks/damage → Replace.
 - 9oil delivery passages
Obstructions → Blow out with compressed air.

EAS00401

CHECKING THE BEARINGS

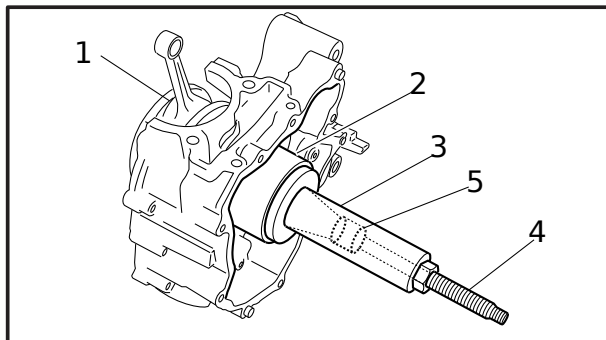
1. Check:
 - 9bearings
Clean and lubricate the bearings, then rotate the inner race with your finger.
Rough movement → Replace.

**CHECKING THE TIMING CHAIN GUIDE**

1. Check:
 - 9timing chain guide (intake side)
Damage/wear → Replace.

**CHECKING THE TIMING CHAIN**

1. Check:
 - 9timing chain
Damage/stiffness → Replace the timing chain and camshaft sprocket as a set.



EAS00408

INSTALLING THE CRANKSHAFT

1. Install:

9crankshaft assembly 1

NOTE:

Use the crankshaft installing tool (spacer 2 , installer pot 3 , installer bolt 4 , adaptor 5) to install the crankcase (left).

C

To avoid scratching the crankshaft and to ease the installation procedure, lubricate the oil seal lips with lithium-soap-based grease and each bearing with engine oil.

W

9Hold the connecting rod at top dead center with one hand while turning the nut of the installing tool with the other.

9Operate the installing tool until the crankshaft bottoms against the bearing .

Crank pot spacer 22:
90890-04081

Crank shaft installer pot 33:
90890-01274

Crank shaft installer bolt 44:
90890-01275

Adaptor 55:
90890-01278

EAS00416

ASSEMBLING THE CRANKCASE

1. Apply:

9sealant

(onto the crankcase mating surfaces)

Yamaha bond No. 1215
90890-85505

NOTE:

Do not allow any sealant to come into contact with the oil gallery 1 .

2. Install:

9dowel pins 2

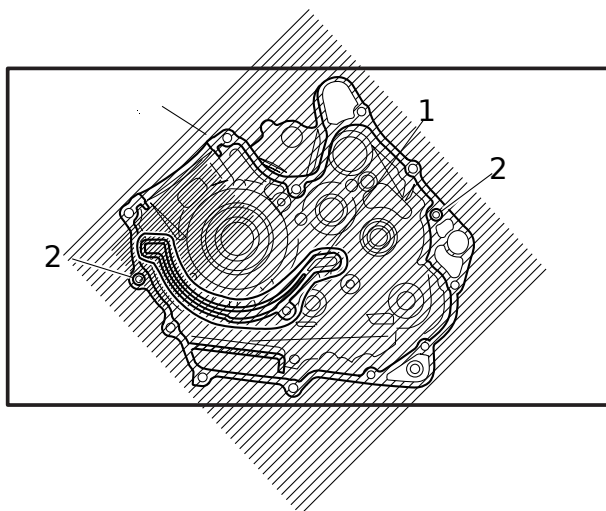
3. Install:

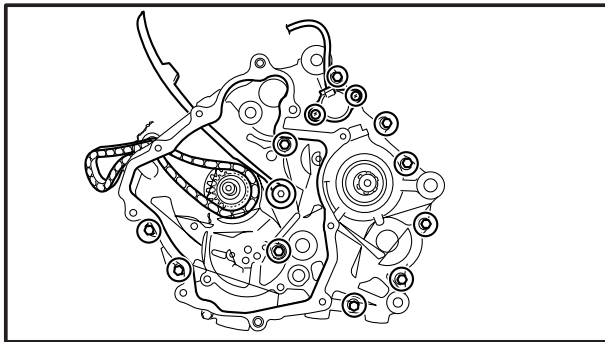
9right crankcase

(onto the left crankcase)

NOTE:

Tap lightly on the right crankcase with a soft face hammer.





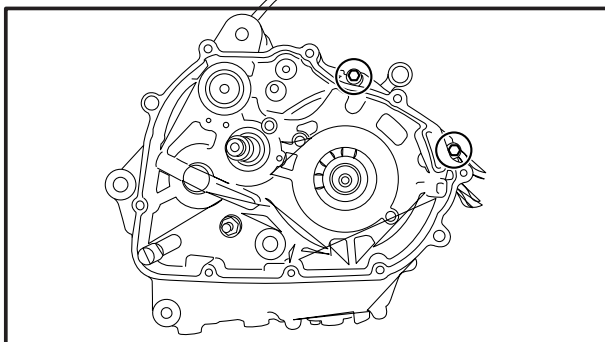
4. Install:

9neutral switch

4 Nm (0.4 m•kg, 3.0 ft•lb)

9crankcase bolts

10 Nm (1.0 m•kg, 7.2 ft•lb)



5. Apply:

9engine oil

(onto the crankshaft bearings and oil delivery holes)

6. Check:

9crankshaft and transmission operation

Rough movement → Repair.

7. Install:

9timing chain

9timing chain guide (intake side)

9timing chain guide (intake side) bolts

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

Apply locking agent (LOCTITE[®]) to the threads of timing chain guide (intake side) bolts.

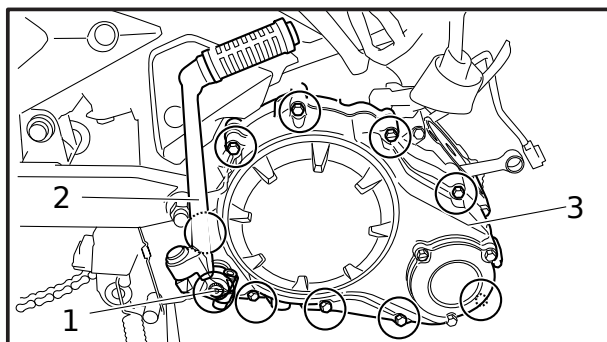
KICKSTARTER

- 8 Collar
- 9 Kickstarter spring
- 0 Washer
- q Spring
- w Kickstarter ratchet gear
- e Kickstarter shaft



REMOVING THE KICKSTARTER

1. Drain:
 - 9engine oil
(completely from the crankcase)
Refer to "CHANGING THE ENGINE OIL" in chapter 3.
 - 9coolant
(completely from the water jacket)
Refer to "CHANGING THE COOLANT" in chapter 3.
2. Remove:
 - 9side cowlings (left and right)
 - 9front cowling
 - 9center panels (upper and lower)
 - 9rear cowlings (left and right)
Refer to "COVERS" in chapter 3.
 - 9carburetor assembly
Refer to "CARBURETOR" in chapter 6.
 - 9muffler
 - 9footrest
 - 9Brake pedal
Refer to "REMOVING THE ENGINE".
3. Remove:
 - 9cylinder head
Refer to "CYLINDER HEAD".
 - 9cylinder
 - 9piston
Refer to "CYLINDER AND PISTON".

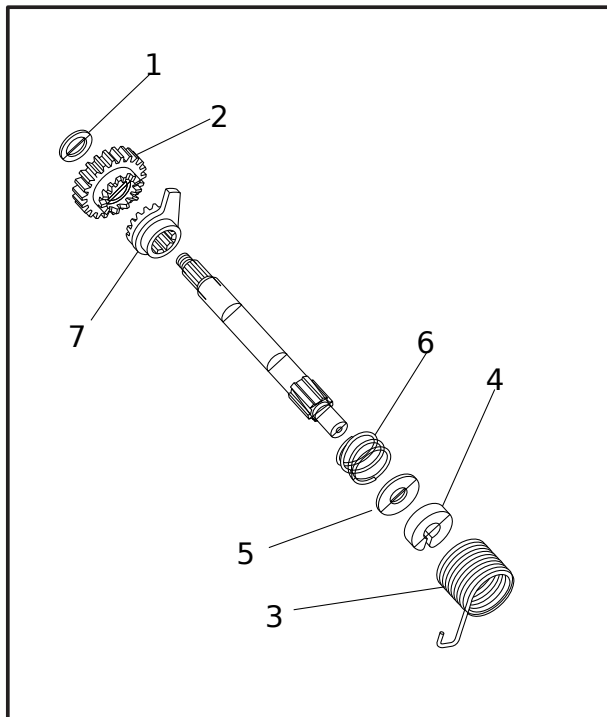


4. Remove:
 - 9kickstarter nut 1
 - 9kickstarter lever 2
5. Remove:
 - 9oil level plug
 - 9crankcase cover bolts
 - 9crankcase cover (right) 3
 - 9gasket
 - 9dowel pins

NOTE:

Be sure to remove the oil level plug first when remove the crankcase (right).

6. Remove:
 - 9clutch
Refer to "CLUTCH".
 - 9shift shaft
Refer to "SHIFTSHAFT".
 - 9oil pump assembly
Refer to "SOILPUMP".
 - 9generator
 - 9starter clutch
Refer to "GENERATOR AND STARTER CLUTCH."
7. Remove:
 - 9starter motor (T135SE)
Refer to "STARTER MOTOR" in chapter 8.
8. Remove:
 - 9engine
Refer to "REMOVING THE ENGINE".
9. Separate:
 - 9crankcase
Refer to "CRANKCASE".
10. Remove:
 - 9guide stopper
 - 9kickstarter shaft assembly



11. Remove:

- 9washer 1
- 9kickstarter gear 2
- 9kickstarter spring 3
- 9collar 4
- 9washer 5
- 9spring 6
- 9kickstarter ratchet gear 7
- 9kickstarter shaft

EAS00339

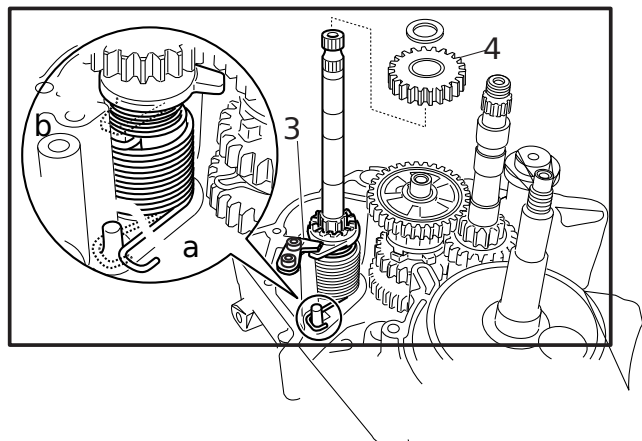
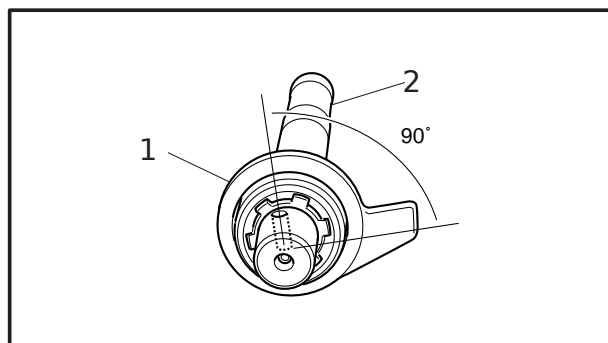
CHECKING THE KICKSTARTER

1. Check:

- 9kickstarter ratchet gear 1
- 9kickstarter gear 2
- Damage/wear → Replace.

2. Check:

- 9kickstarter spring
- Damage/wear → Replace.



INSTALLING THE KICKSTARTER

1. Install:
 - 9kickstarter ratchet gear 1
 - (on to the kickstarter shaft)
 - 9kickstarter shaft 2
 - 9kickstarter spring

NOTE:

9Offset the kickstarter ratchet gear as shown, and then align the spline to install the kickstarter ratchet gear.

9Hook the kickstarter spring end onto the pin a in the crankcase, and then turn the kickstarter shaft counter-clockwise to 3/4 turns b .

2. Install:
 - 9guide stopper 3
 - 9guide stopper bolts

12 Nm (1.2 m•kg, 9.0 ft•lb)

- 9kickstarter gear 4

3. Install:
 - 9crankcase
 - Refer to "CRANKCASE".
4. Install:
 - 9engine
 - Refer to "REMOVING THE ENGINE".
5. Install:
 - 9starter motor (T135SE)
 - Refer to "STARTER MOTOR (T135SE)" in chapter 8.
6. Install:
 - 9oil pump assembly
 - Refer to "OILPUMP".
 - 9generator
 - Refer to "GENERATOR AND STARTER CLUTCH".
 - 9shift shaft
 - Refer to "SHIFTSHAFT".
 - 9clutch
 - Refer to "CLUTCH".
7. Install:
 - 9gasket
 - 9dowel pins
 - 9crankcase cover bolts
 - 9crankcase cover (right)
 - 9oil level plug
8. Install:
 - 9kickstarter lever
 - 9kickstarter lever nut

9. Install:

9piston

9cylinder

Refer to "CYLINDER AND PISTON".

9cylinder head

Refer to "CYLINDER HEAD".

9radiator assembly

Refer to "RADIATOR" in chapter 5.

9cylinder head

Refer to "CYLINDER HEAD".

10. Install:

9muffler

9footrest

9brake pedal

Refer to "REMOVING THE ENGINE".

9inner panel

9center panels (left and right)

9front cowling

9side cowlings (left and right)

Refer to "COVERS" in chapter 3.

11. Fill:

9coolant

(completely from the water jacket)

Refer to "CHANGING THE COOLANT" in chapter 3.

9engine oil

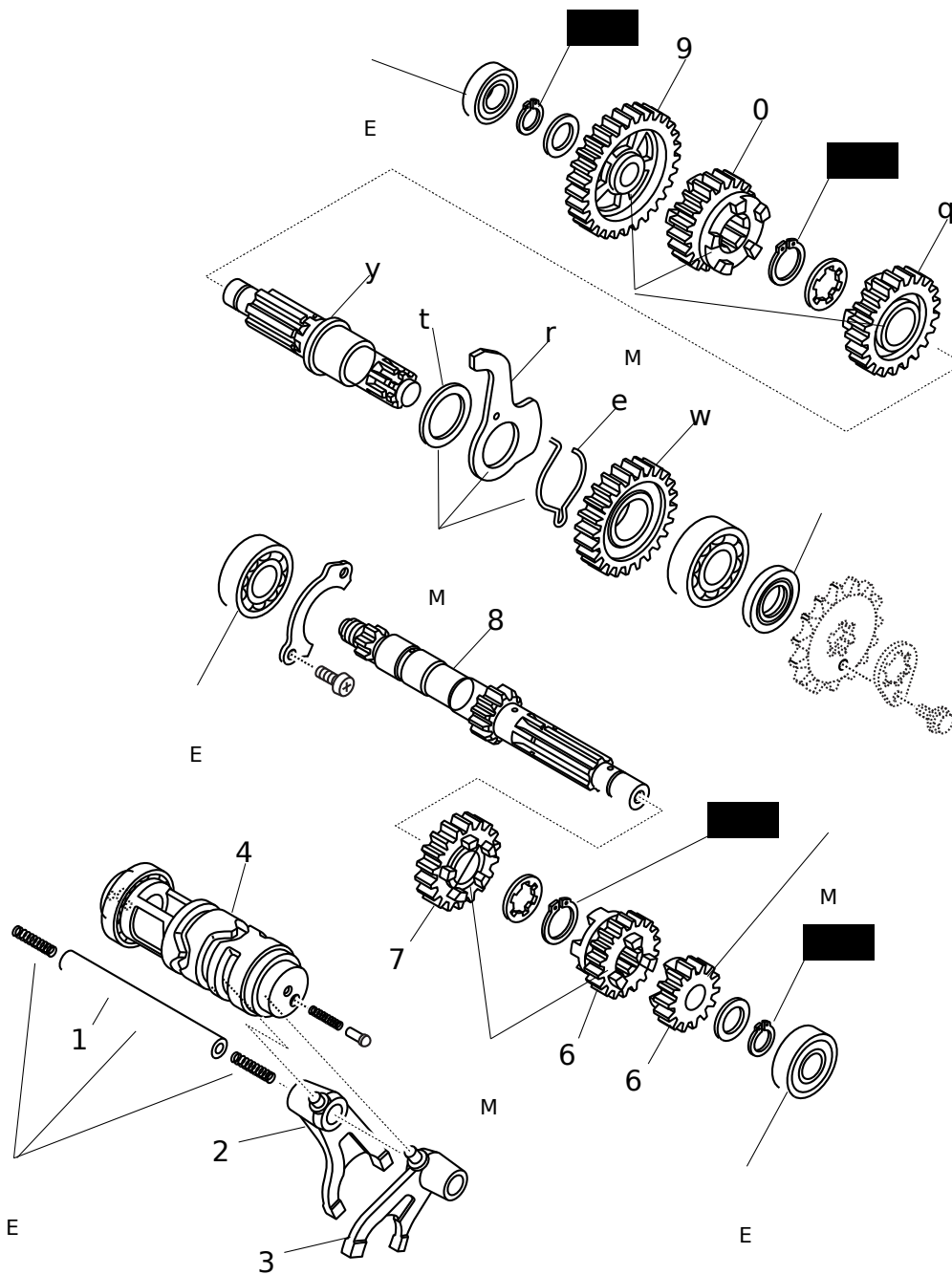
(completely from the crankcase)

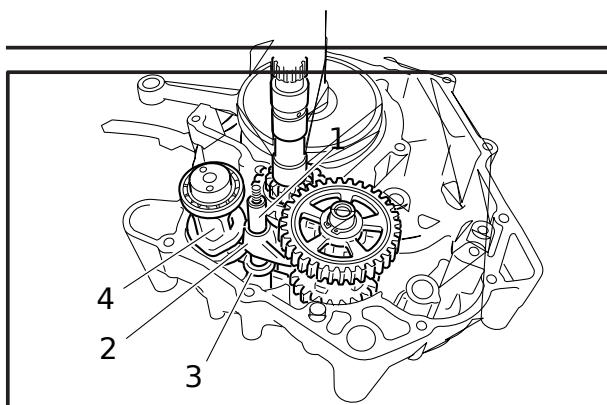
Refer to "CHANGING THE ENGINE OIL" in chapter 3.

EASF0041

TRANSMISSION

- | | | | |
|---|---------------------------|---|-------------------|
| 1 | Shift fork guide bar | 9 | 1st wheel gear |
| 2 | Shift fork "R" | 0 | 4th wheel gear |
| 3 | Shift fork "L" | q | 3rd wheel gear |
| 4 | Shift drum | w | 2nd wheel gear |
| 5 | 2nd pinion gear | e | Side plate spring |
| 6 | 3rd pinion gear | r | Side plate |
| 7 | 4th pinion gear | t | Washer |
| 8 | Main axle/1st pinion gear | y | Drive axle |





EASF0042

REMOVING THE TRANSMISSION**NOTE:**

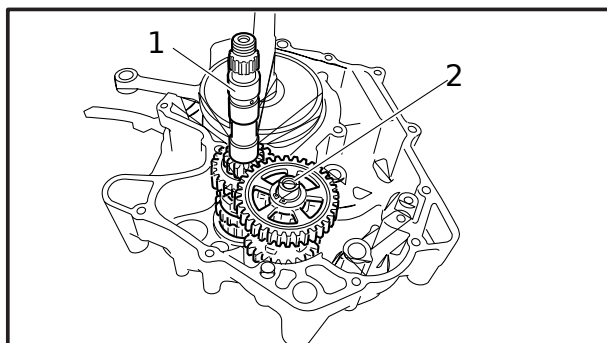
Prior to removing the transmission, separate the crankcase.

1. Remove:

- 9shift fork guide bar 1
- 9shift fork guide bar springs
- 9shift fork "R" 2
- 9shift fork "L" 3
- 9shift drum 4

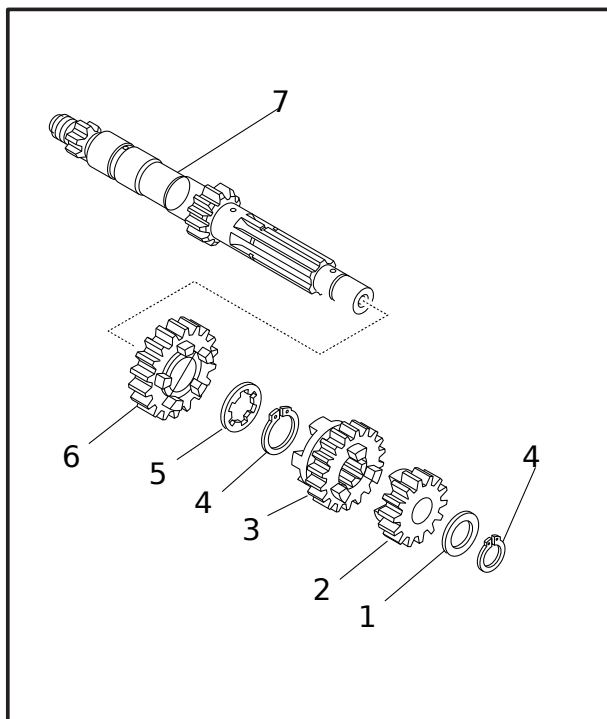
NOTE:

Note the position of each part. Pay particular attention to location and direction of shift forks.



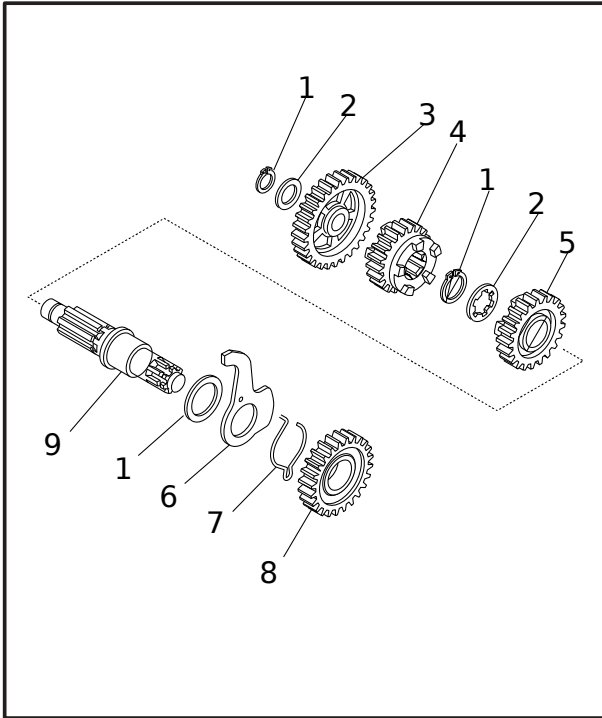
2. Remove:

- 9main axle assembly 1
- 9drive axle assembly 2

**DISASSEMBLING THE TRANSMISSION**

1. Remove:

- 9washer 1
- 92nd pinion gear 2
- 93rd pinion gear 3
- 9circlip 4
- 9washer 5
- 94th pinion gear 6
- 9main axle/1st pinion gear 7



2. Remove:
- 9circlips 1
 - 9washers 2
 - 91st wheel gear 3
 - 94th wheel gear 4
 - 93rd wheel gear 5
 - 9side plate 6
 - 9side plate spring 7
 - 92nd wheel gear 8
 - 9drive axle 9

EAS00421

CHECKING THE SHIFT FORKS

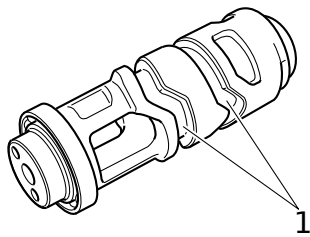
The following procedure applies to both of the shift forks.

1. Check:
 - 9shift fork cam follower 1
 - 9shift fork pawl 2
 - Bends/damage/scoring/wear → Replace the shift fork.
2. Check:
 - 9shift fork guide bar
 - Roll the shift fork guide bar on a flat surface.
 - Bends → Replace.

W _____

Do not attempt to straighten a bent shift fork guide bar.

3. Check:
 - 9shift fork movement
 - (along the shift fork guide bar)
 - Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAS00422

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:

9shift drum grooves 1

Damage/scratches/wear → Replace the shift drum assembly.

9shift drum bearing

Damage/pitting → Replace the shift drum assembly.

EAS00424

CHECKING THE TRANSMISSION

1. Measure:

9main axle runout

(with a centring device and dial gauge 1)

Out of specification → Replace the main axle.

Main axle runout limit 0.03 mm (0.0012 in)

2. Measure:

9drive axle runout

(with a centring device and dial gauge 1)

Out of specification → Replace the drive axle.

Drive axle runout limit 0.03 mm (0.0012 in)
--

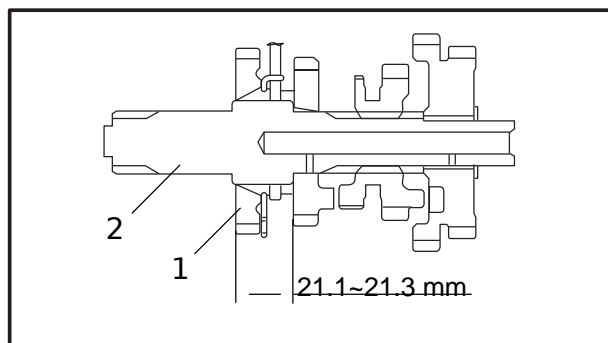
3. Check:

9transmission gears

Blue discoloration/pitting/wear → Replace the defective gear(s).

9transmission gear dogs

Cracks/damage/rounded edges → Replace the defective gear(s).



4. Check:

9transmission gear engagement
(each pinion gear to its respective wheel gear)

Incorrect → Reassemble the transmission axle assemblies.

NOTE:

When reassembling the drive axle, press the 2nd wheel gear 1 onto the drive axle 2 as shown.

5. Check:

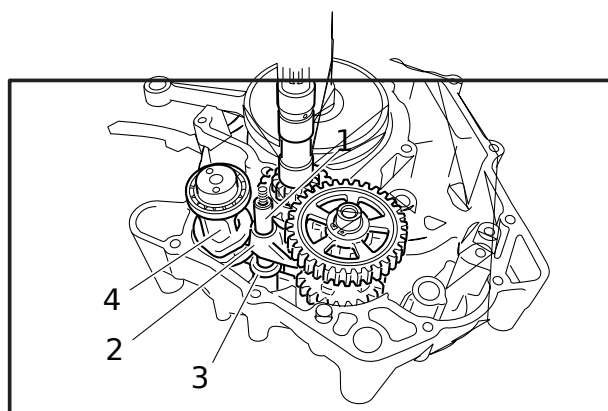
9transmission gear movement

Rough movement → Replace the defective part(s).

6. Check:

9circlips

Bends/damage/looseness → Replace.



EAS00426

INSTALLING THE TRANSMISSION

1. Install:

9shift fork guide bar 1

9shift fork "R" 2

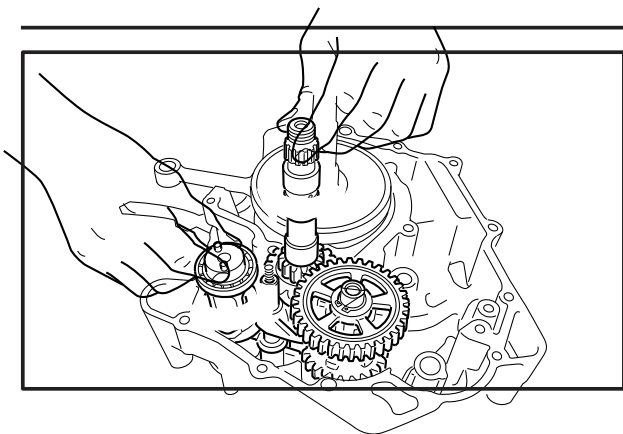
9shift fork "L" 3

9shift drum 4

NOTE:

9The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence :
"R", "L".

9Be sure install the side plate into the slot on the shift drum.



2. Check:

9transmission

9shift drum

9shift forks

Rough movement → Repair.

NOTE:

9Oil each gear, shaft, and bearing thoroughly.

9Before assembling the crankcase, be sure that the transmission is in neutral and that the gears turn freely.

ENG

CHAPTER 5

COOLINGSYSTEM

RADIATOR5-1

WATER PUMP.....5-2

 REMOVING THE RADIATOR5-3

 CHECKING THE RADIATOR5-4

 CHECKING THE THERMOSTAT.....5-6

 DISASSEMBLING THE WATER PUMP.....5-6

 CHECKING THE WATER PUMP.....5-7

 ASSEMBLING THE WATER PUMP.....5-8

 INSTALLING THE THERMOSTAT.....5-8

 INSTALLING THE WATER PUMP.....5-9

 INSTALLING THE RADIATOR5-9



COOL	
------	--

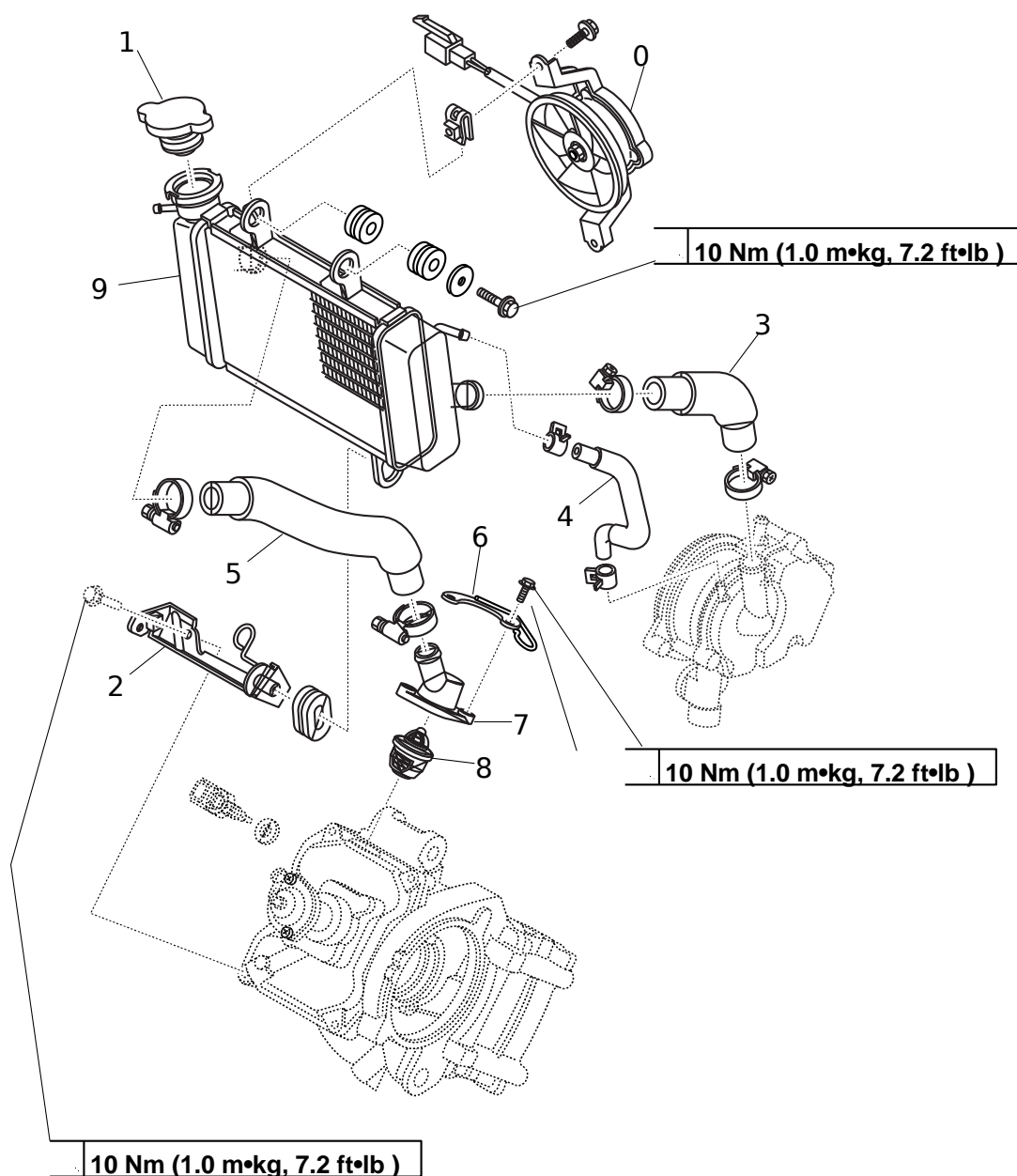


EAS00454

COOLING SYSTEM

RADIATOR

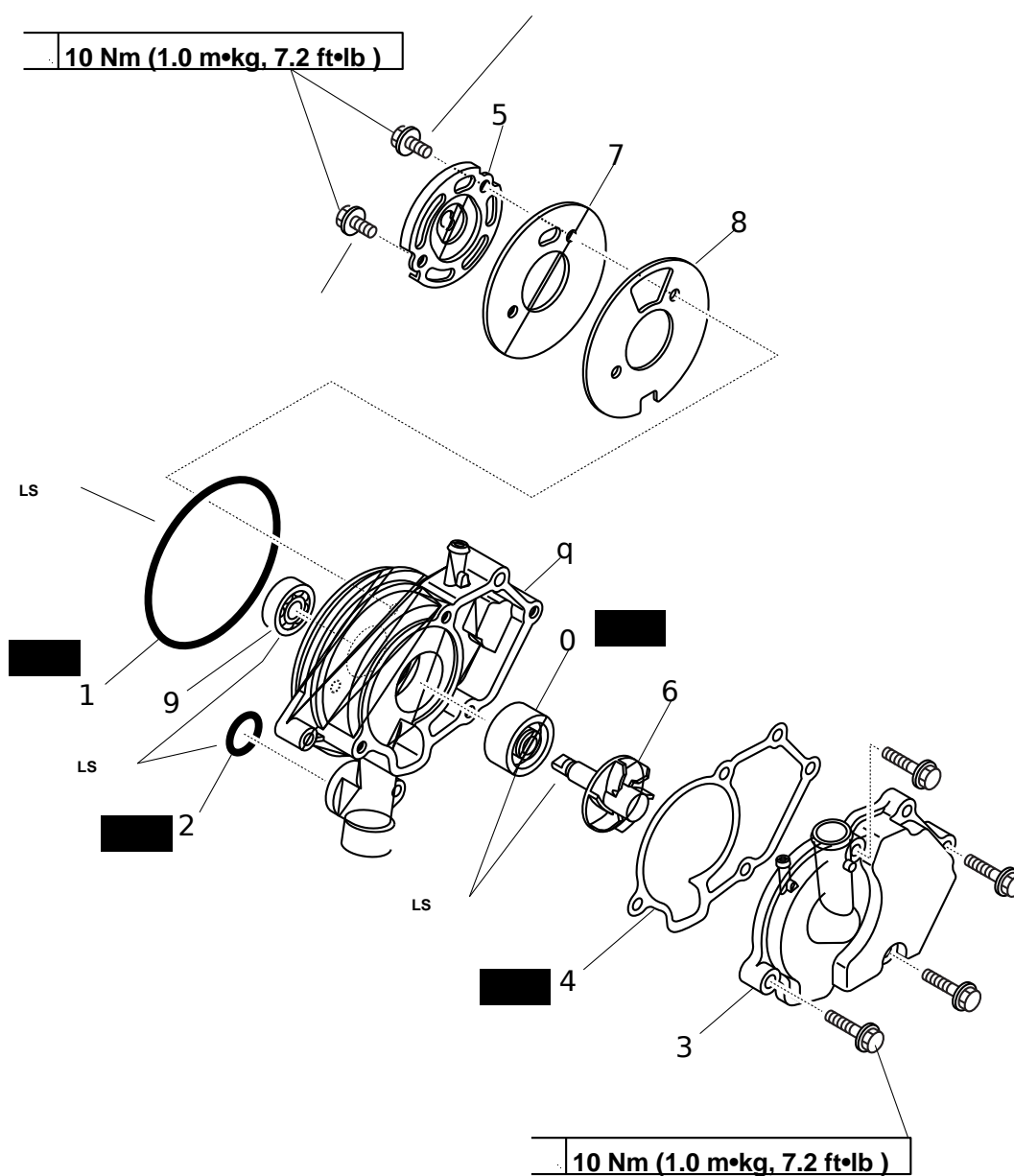
- 1 Radiator cap
- 2 Bracket
- 3 Water pump inlet hose
- 4 Radiator outlet hose
- 5 Radiator inlet hose
- 6 Bracket
- 7 Thermostat housing cover
- 8 Thermostat
- 9 Radiator assembly
- 0 Fan motor assembly



EAS00468

WATER PUMP

- | | |
|------------------------|----------------------|
| 1 O-ring | 9 Bearing |
| 2 O-ring | 0 Water pump seal |
| 3 Water pump cover | q Water pump housing |
| 4 Gasket | |
| 5 Plate | |
| 6 Impeller | |
| 7 Plate | |
| 8 Housing cover gasket | |



REMOVING THE RADIATOR

W

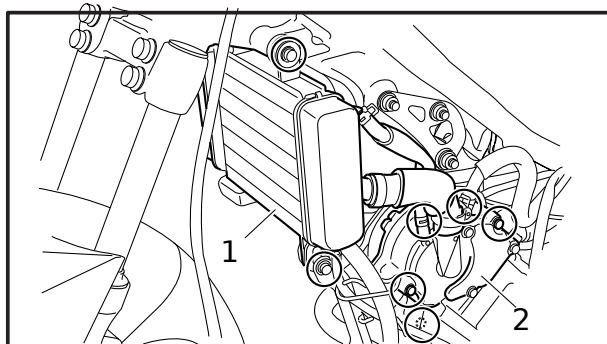
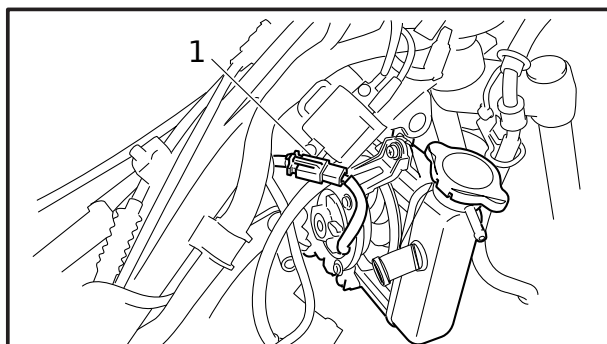
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows: Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape.

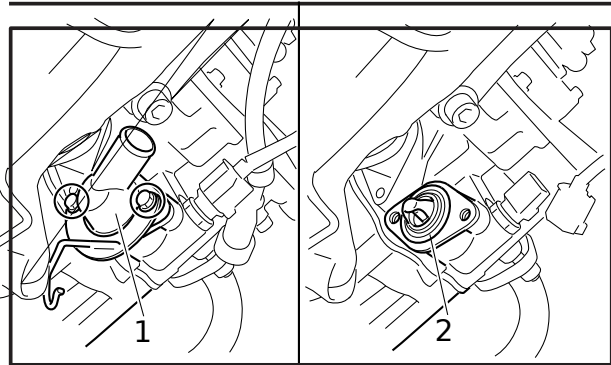
When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.

1. Remove:
 - 9side cowlings (left and right)
 - 9front cowling
 - 9center panels
 - 9seat assembly with battery box
 - 9inner panel

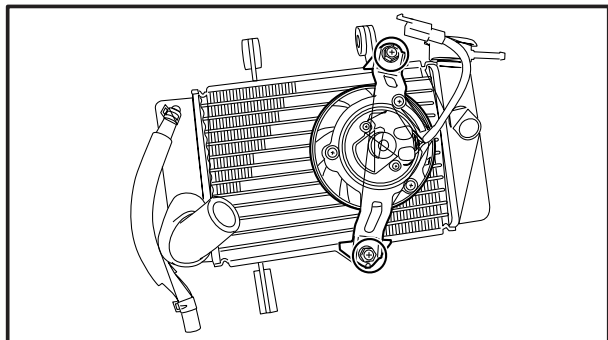
Refer to "REMOVING THE FRONT COWLINGS" in chapter 3.
2. Drain:
 - 9cooling water

Refer to "CHANGING THE COOLANT" in chapter 3.
3. Disconnect:
 - 9radiator inlet hose
 - 9radiator outlet hose
 - 9radiator outlet pipe
 - 9fan motor coupler 1
4. Remove:
 - 9radiator assembly 1
 - 9water pump assembly 2
 - 9O-rings





5. Remove:
- 9bracket
 - 9thermostat cover 1
 - 9thermostat 2



6. Remove:
- 9fan motor



EAS00455

CHECKING THE RADIATOR

1. Check:
- 9radiator fins
 - Obstruction → Clean.
 - Apply compressed air to the rear of the radiator.
 - Damage → Repair or replace.

NOTE:

Straighten any flattened fins with a thin, flat-head screwdriver.

2. Check:
- 9radiator hoses
 - 9radiator pipes
 - Cracks/damage → Replace.



3. Measure:

⑨ radiator cap opening pressure

Below the specified pressure → Replace the radiator cap.

Radiator cap opening pressure

93.2 – 122.6 kPa

(0.93 – 1.23 kg/cm², 13.5 – 17.8 psi)

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- a. Install the radiator cap tester 1 and radiator cap tester adapter 2 to the radiator cap 3 .

Radiator cap tester 11

90890-01325

Radiator cap tester adapter 22

90890-01352

- b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

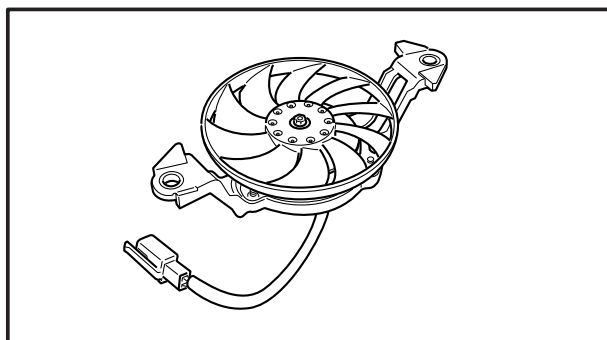
4. Check:

⑨ radiator fan motor

Damage → Replace.

Malfunction → Check and repair.

Refer to “COOLING SYSTEM” in chapter 8.



EAS00462

CHECKING THE THERMOSTAT

1. Check:

9thermostat 1

Does not open at 80.5 – 83.5° C (176.9 – 182.3° F) → Replace.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- Suspend the thermostat in a container filled with water.
- Slowly heat the water.
- Place a thermometer in the water.
- While stirring the water, observe the thermostat and thermometer's indicated temperature.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- Thermometer
- Water
- Thermostat
- Container

- â Fully closed
 ∫ Fully open

NOTE:

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

2. Check:

9thermostat housing cover

9thermostat housing

Cracks/damage → Replace.

EAS00470

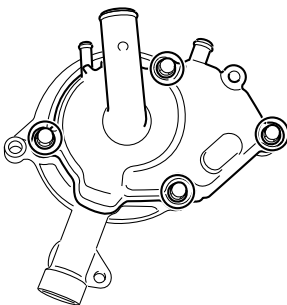
DISASSEMBLING THE WATER PUMP

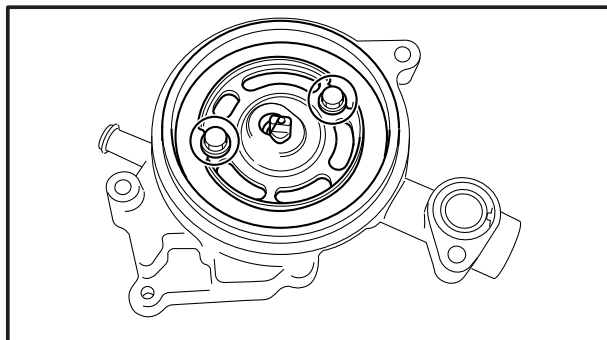
1. Remove:

9water pump cover

9gasket

9O-ring

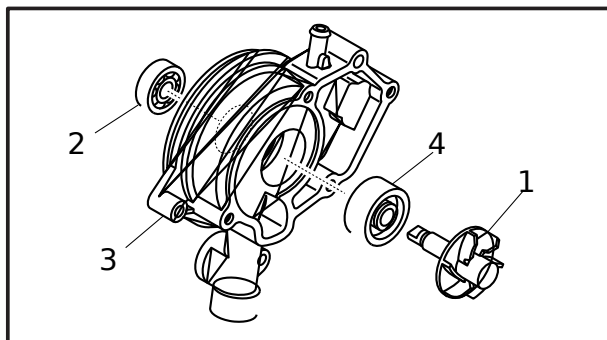




2. Remove:
 - 9plate

NOTE:

Slide the plate as shown, and then remove the plate from the water pump housing.



3. Remove:
 - 9impeller 1
 - 9bearing 2

NOTE:

Remove the bearing from the outside of the water pump housing.

- 3 Water pump housing

4. Remove:
 - 9water pump seal 4

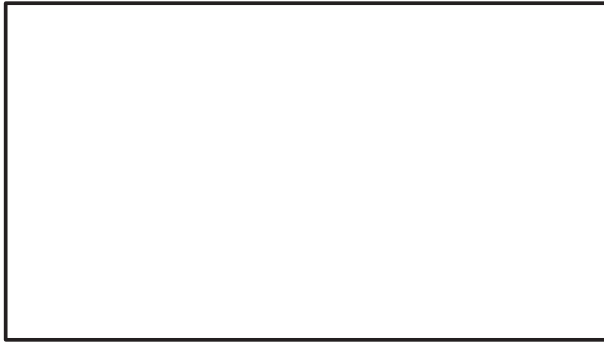
NOTE:

Remove the water pump seal from the inside of the water pump housing.

EAS00473

CHECKING THE WATER PUMP

1. Check:
 - 9water pump housing cover
 - 9water pump housing
 - 9impeller
 - 9rubber damper
 - 9rubber damper holder
 - 9water pump seal
 - 9oil seal
 - Cracks/damage/wear → Replace.
2. Check:
 - 9bearing
 - Rough movement → Replace.



EAS00475

ASSEMBLING THE WATER PUMP

1. Install:

9water pump seal 1

NOTE:

Install the water pump seal with the special tools.

Mechanical seal installer**90890-04145 22****Middle driven shaft bearing driver****90890-04058 33**

â Push down.

2. Lubricate:

9water pump seal 1

Recommended lubricant**Lithium soap base grease**

3. Install:

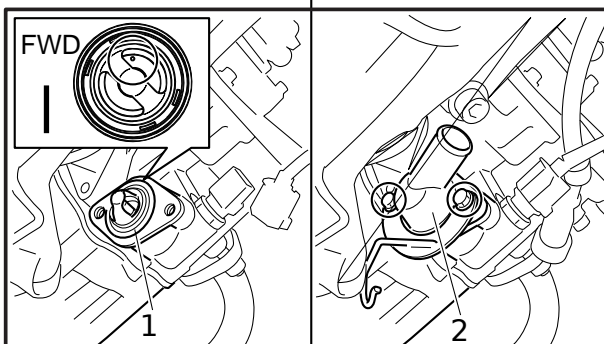
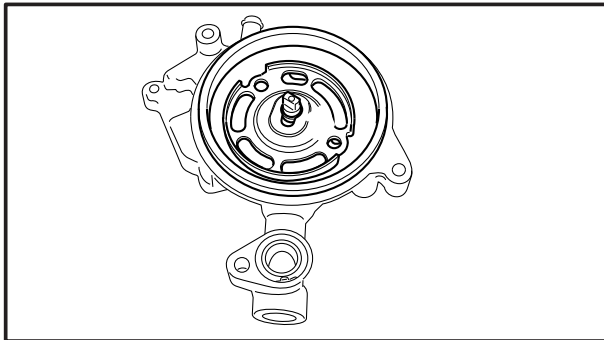
9impeller

9plate

10 Nm (1.0 m•kg, 7.2 ft•lb)**NOTE:**

9Align the slit in the impeller shaft with the slot of the plate.

9After installation, check that the impeller shaft rotates smoothly.



EAS00467

INSTALLING THE THERMOSTAT

1. Install:

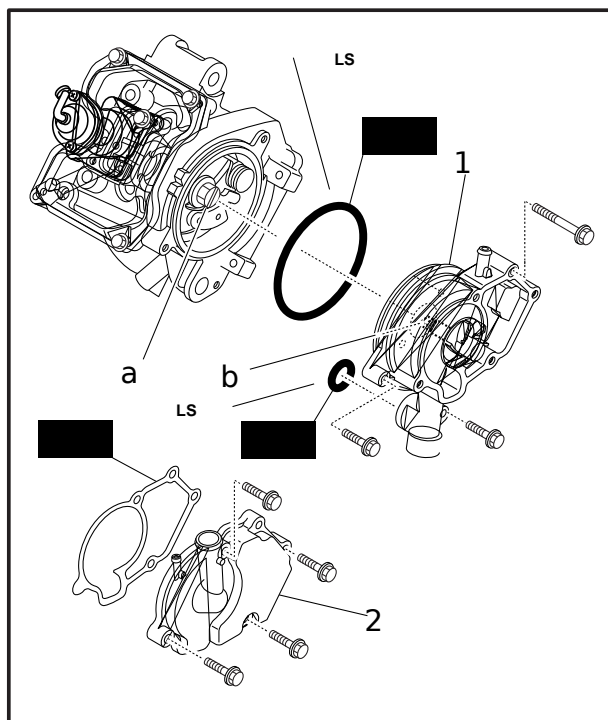
9thermostat 1

9thermostat cover 2

9bracket

10 Nm (1.0 m•kg, 7.2 ft•lb)**NOTE:**

Face the hole toward to the forward to install.



EAS00478

INSTALLING THE WATER PUMP

1. Install:

9 O-rings

9 water pump housing 1

10 Nm (1.0 m•kg, 7.2 ft•lb)

W

Always use a new O-ring.

NOTE:

9 Align the projection a on the impeller shaft with the slit b on the camshaft.

9 Lubricate the O-ring with a thin coat of lithium-soap-based grease.

2. Install:

9 water pump housing cover 2

10 Nm (1.0 m•kg, 7.2 ft•lb)

9 water pump inlet hose

9 water pump outlet hose

EAS00456

INSTALLING THE RADIATOR

1. Install:

9 radiator assembly

10 Nm (1.0 m•kg, 7.2 ft•lb)

2. Connect:

9 fan motor coupler

9 radiator outlet pipe

9 radiator outlet hose

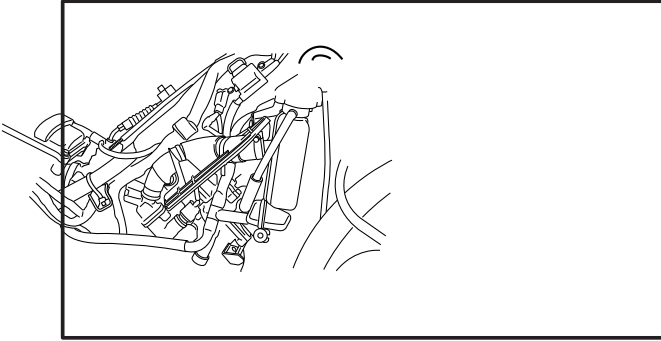
9 radiator inlet hose

3. Fill:

9 cooling system

(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" in chapter 3.



4. Check:

9cooling system

Leaks → Repair or replace any faulty part.

★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

- a. Attach the radiator cap tester 1 to the radiator.

Radiator cap tester**90890-01325****Radiator cap tester adapter****90890-01352**

- b. Apply 100 kPa (1.0 kg/cm², 14.22 psi) of pressure.

- c. Measure the indicated pressure with the gauge.

★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

5. Measure:

9radiator cap opening pressure

Below the specified pressure → Replace the radiator cap.

Refer to "CHECKING THE RADIATOR".

6. Install:

9inner panel

9seat assembly with battery box

9center panels

9front cowling

9side cowlings (left and right)

Refer to "REMOVING THE FRONTCOWLINGS" in chapter 3.

CHAPTER 6 CARBURETOR

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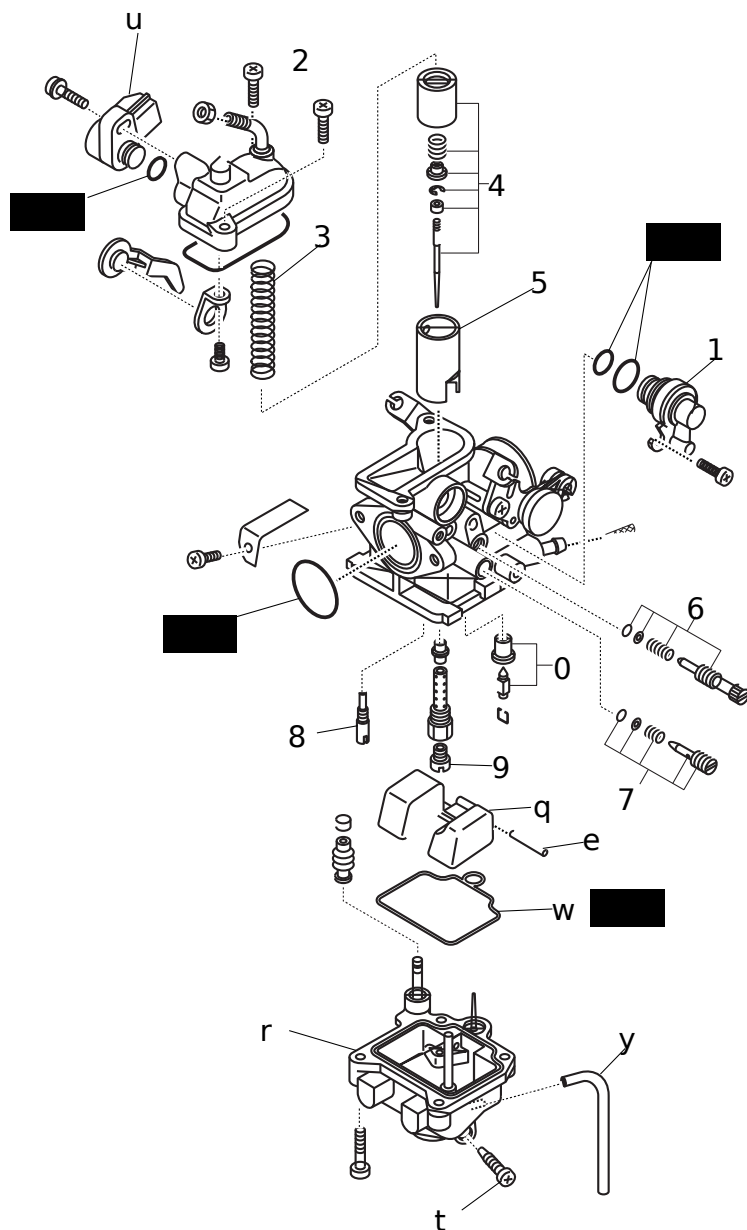


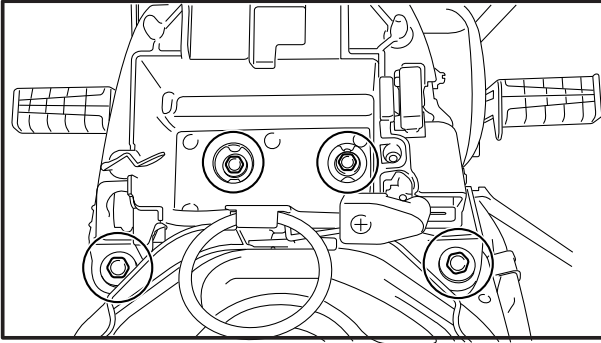
EASF0043

CARBURETOR

CARBURETOR

- | | |
|------------------------------|-------------------------------|
| 1 Coasting enricher assembly | w Float chamber rubber gasket |
| 2 Carburetor top cover | e Float pivot pin |
| 3 Throttle valve spring | r Float chamber |
| 4 Needle set | t Fuel drain screw |
| 5 Throttle valve | y Carburetor overflow hose |
| 6 Throttle stop screw set | u Throttle position sensor |
| 7 Pilot air screw set | |
| 8 Needle jet | |
| 9 Main jet | |
| 0 Needle valve assembly | |
| q Float | |



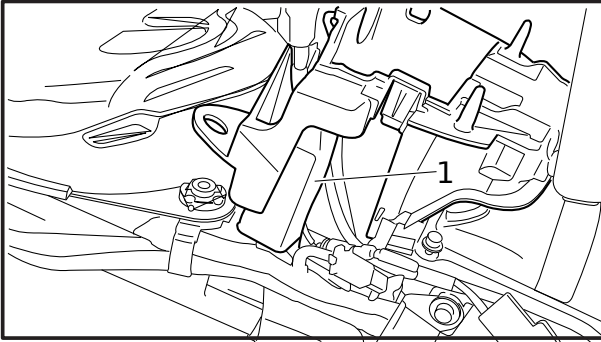


REMOVING THE CARBURETOR

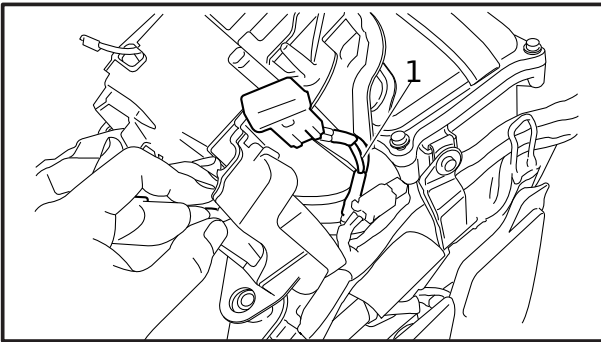
W

**Gasoline is highly flammable.
Avoid spilling fuel on the hot engine.**

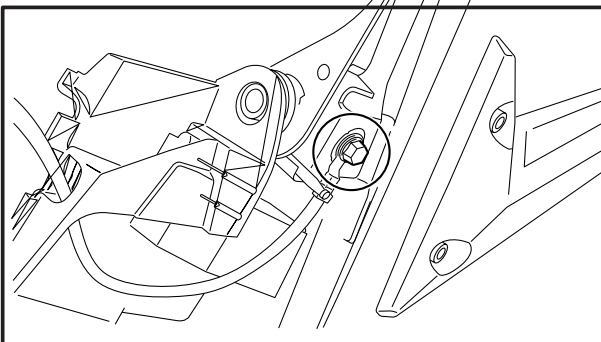
1. Remove:
 - 9battery
 - 9seat assembly with battery box



2. Remove:
 - 9starter relay 1 (T135SE)

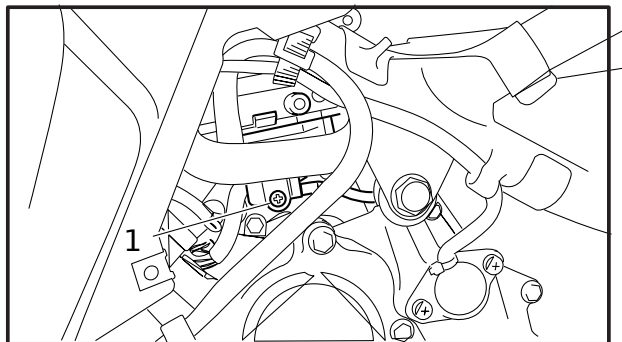


3. Remove:
 - 9positive lead 1
(from the battery box)

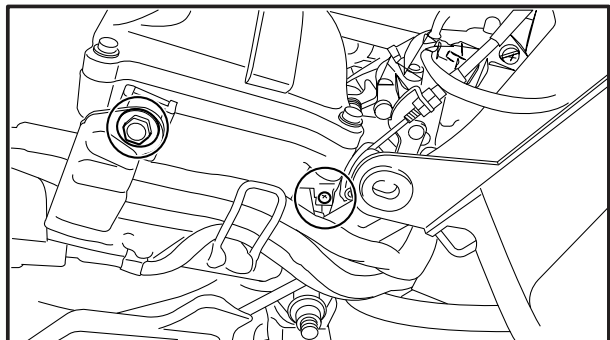


4. Remove:
 - 9negative lead
(from the frame)

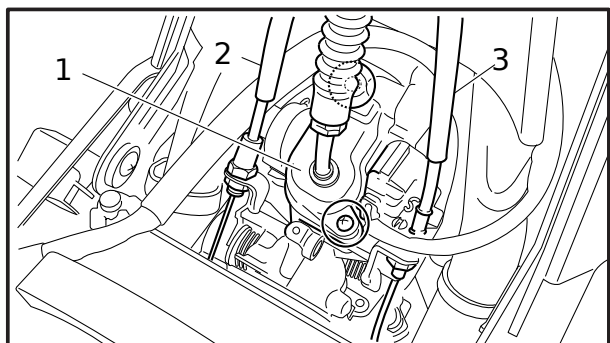
5. Loosen:
 - 9rear cowling (left)
 Refer to "REMOVING THE REAR COWL-
INGS" in chapter 3.



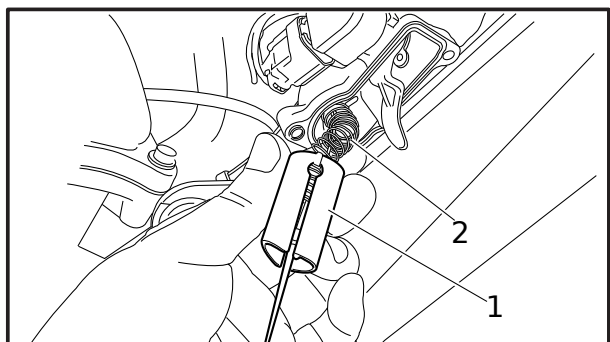
6. Loosen:
9fuel drain screw 1
7. Drain:
9fuel (from float chamber)



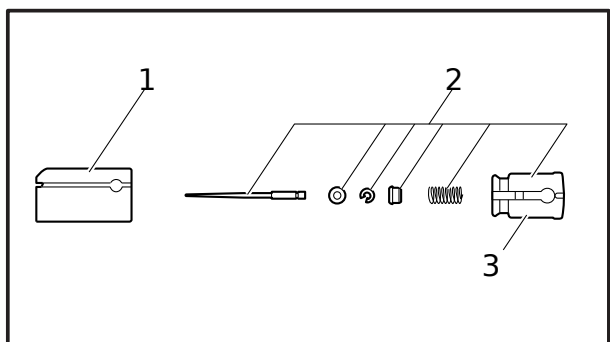
8. Loosen:
9clamp screw
9air filter assembly bolt



9. Remove:
9carburetor top cover 1
9o-ring
9choke cable 2
9accelerator pump cable 3



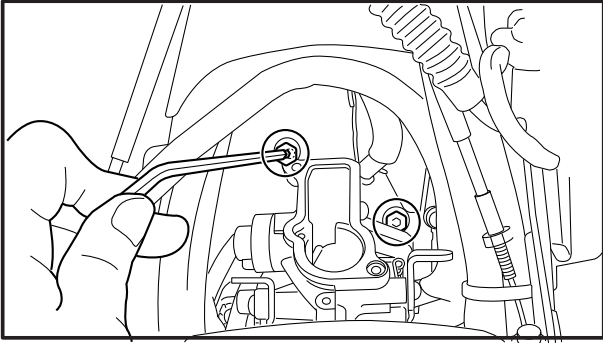
10. Remove:
9throttle valve assembly 1
9throttle valve spring 2



11. Remove:
9throttle valve 1
9jet needle set 2
9holder 3

cC

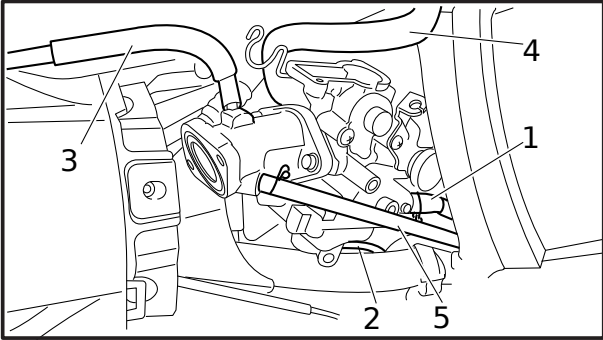
**Do not make a burr when remove the holder
33from throttle valve 11**



12. Remove:
 9carburetor assembly

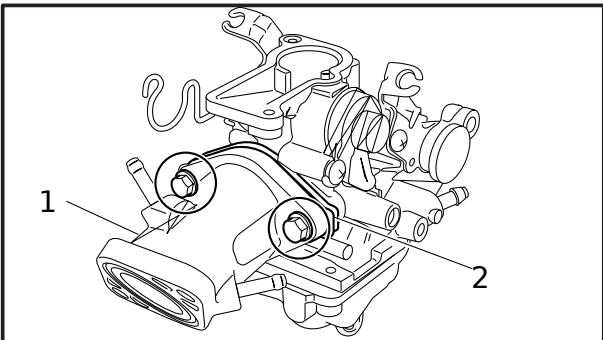
NOTE:

Use the ball point hexagon wrench to loosen the bolts.



13. Disconnect:
 9fuel hose 1
 9carburetor overflow hose 2
 9vacuum sensing hose 3
 9air vent hose 4
 9vacuum sensing hose 5

14. Remove:
 9carburetor assembly



15. Remove:
 9intake manifold bolt
 9intake manifold 1
 9joint 2

16. Move:
 9air filter assembly

DISASSEMBLING THE CARBURETOR

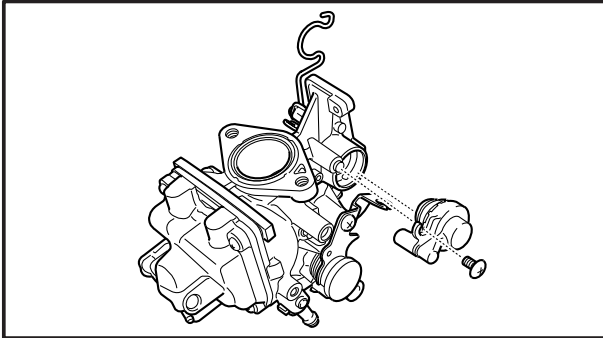
NOTE:

The following parts can be cleaned and inspected without disassembly.

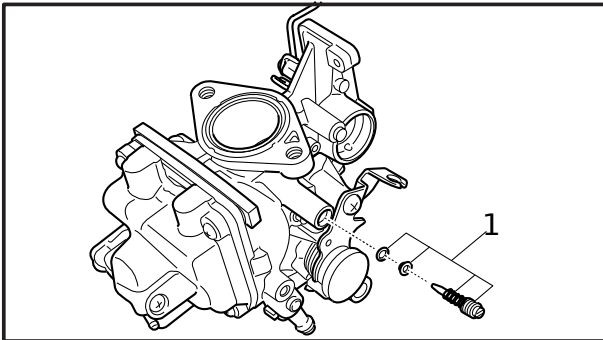
9Coasting enricher

9Throttle stop screw

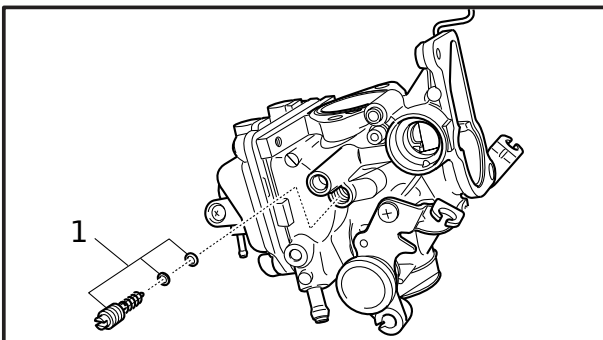
9Pilot air screw



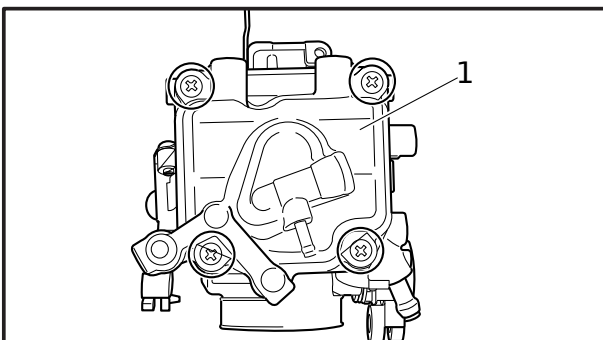
1. Remove:
 - 9coasting enricher assembly
 - 9o-ring



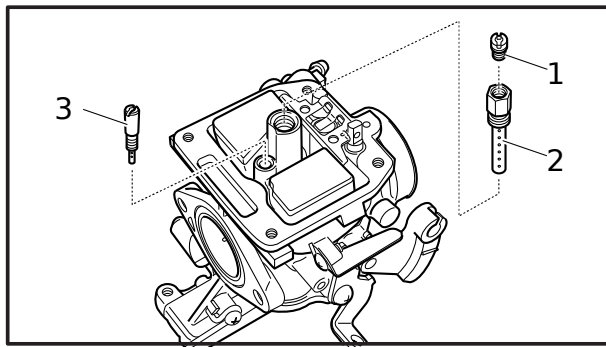
2. Remove:
 - 9pilot air screw set 1



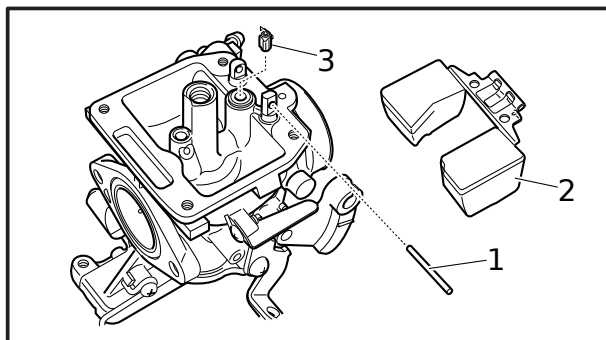
3. Remove:
 - 9throttle stop screw set 1



4. Remove:
 - 9float chamber 1
 - 9float chamber rubber gasket



5. Remove:
 - 9main jet 1
 - 9needle jet 2
 - 9pilot jet 3

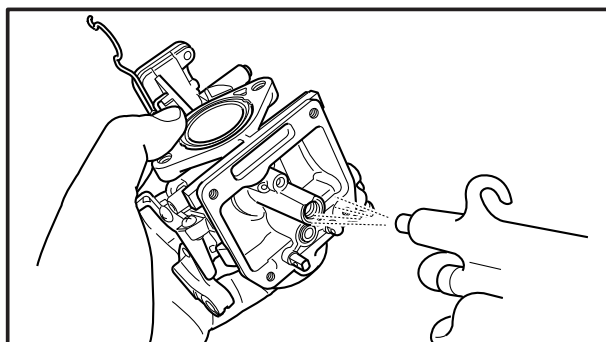


6. Remove:
 - 9float pivot pin 1
 - 9float 2
 - 9needle valve 3

EAS00485

CHECKING THE CARBURETOR

1. Check:
 - 9carburetor body
 - 9float chamber
 - Cracks/damage → Replace.

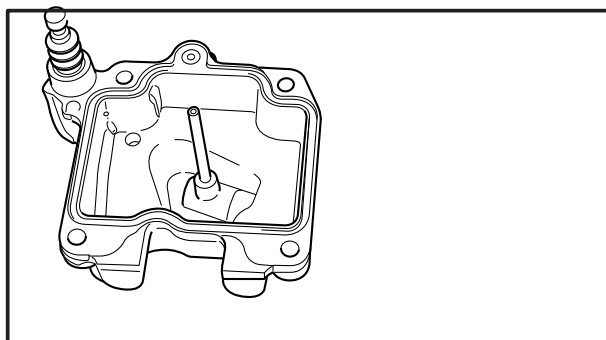


2. Check:
 - 9fuel passages
 - Obstructions → Clean.

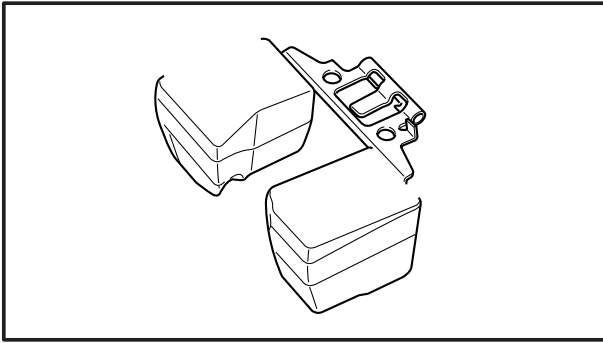
★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

- a. Wash the carburetor in a petroleum-based solvent. Do not use any caustic carburetor cleaning solution.
- b. Blow out all of the passages and jets with compressed air.

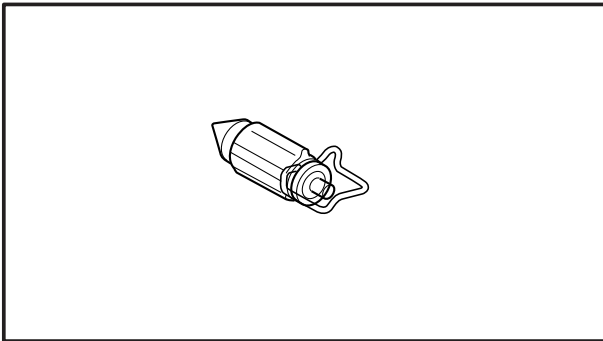
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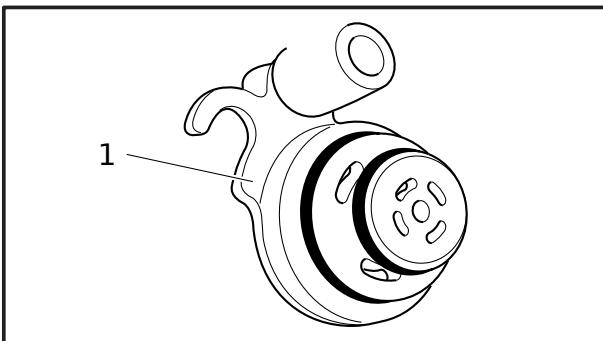
3. Check:
 - 9float chamber body
 - Dirt → Clean.
4. Check:
 - 9float chamber rubber gasket
 - Cracks/damage/wear → Replace.



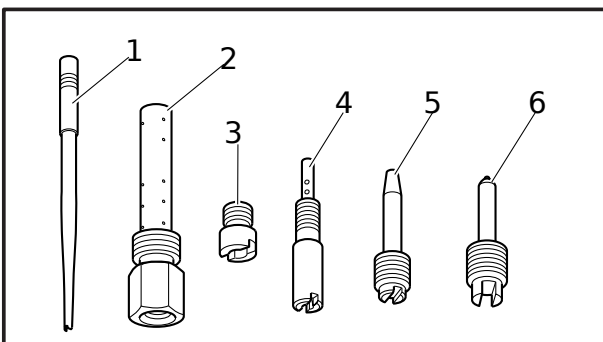
5. Check:
 9float
 Damage → Replace.



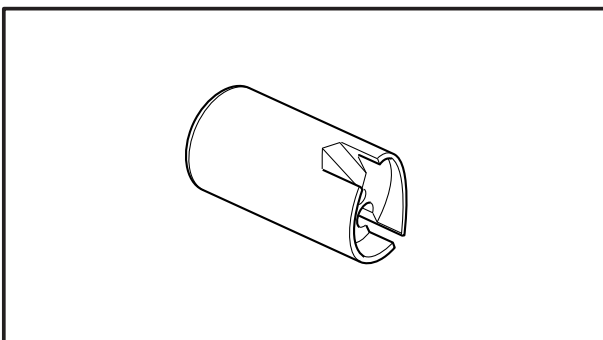
6. Check:
 9needle valve
 Damage/wear → Replace.



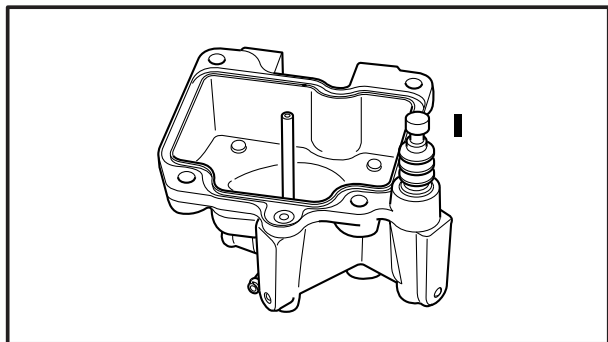
7. Check:
 9coasting enricher assembly 1
 Cracks/damage → Replace.



8. Check:
 9jet needle 1
 9needle jet 2
 9main jet 3
 9pilot jet 4
 9pilot air screw 5
 9throttle stop screw 6
 Bends/damage/wear → Replace.
 Obstruction → Clean.
 Blow out the jets with compressed air.



9. Check:
 9throttle valve
 Damage/scratches/wear → Replace.



10. Check:
- 9accelerator pump
stuck or unsmooth operation → Replace
the float chamber.

11. Check:
- 9air vent hose
 - 9fuel hoses
 - Cracks/damage/wear → Replace.
 - Obstructions → Clean.
 - Blow out the hoses with compressed air.

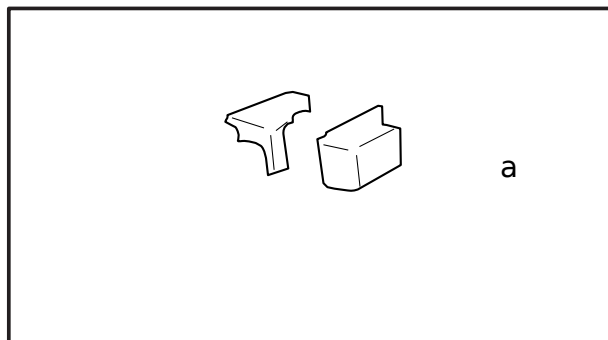
EAS00487

ASSEMBLING THE CARBURETOR

C

9 Before assembling the carburetor, wash all of the parts in a petroleum-based solvent.

9 Always use a new gasket and new O-rings.



1. Measure:

9 float height a

Out of specification → Adjust.

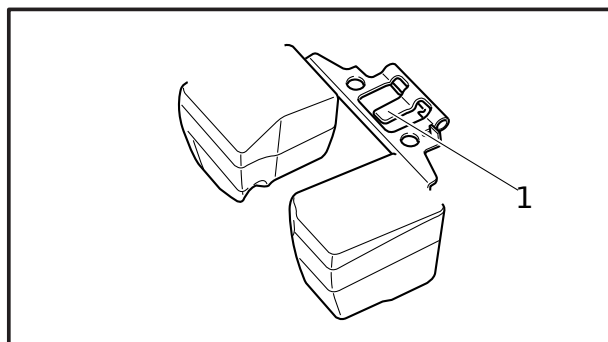
	Float height 9.2 mm (0.36 in)
--	--

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- Hold the carburetor upside down.
- Measure the distance from the mating surface of the float chamber (with the gasket removed) to the top of the float.

NOTE:

The float arm should rest on the needle valve without depressing it.



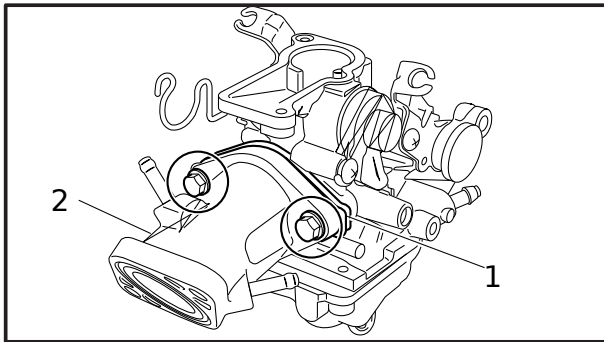
- If the float height is not within specification, check the needle valve seat and needle valve.
- If either the needle valve seat or needle valve is worn, replace them both.
- If both the needle valve seat and needle valve are fine, adjust the float height by bending the float tang 1 .
- Check the float height again.

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2. Install:

9coasting enricher assembly

9o-ring



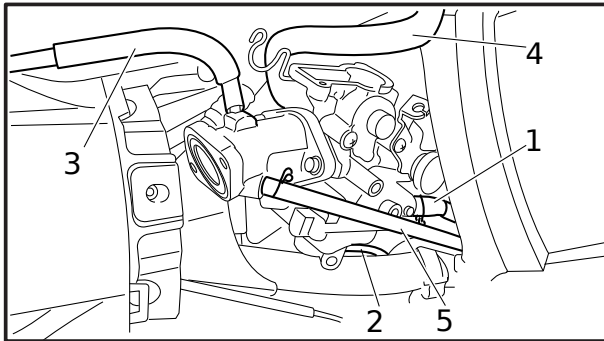
EAS00492

INSTALLING THE CARBURETOR

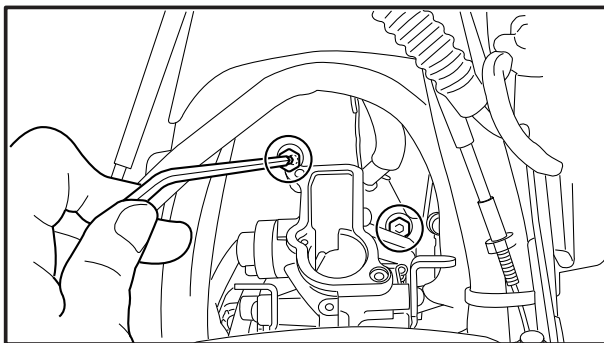
1. Install:
 - 9needle set

2. Install:
 - 9joint 1
 - 9intake manifold 2

10 Nm (1.0 m·kg, 7.2 ft·lb)



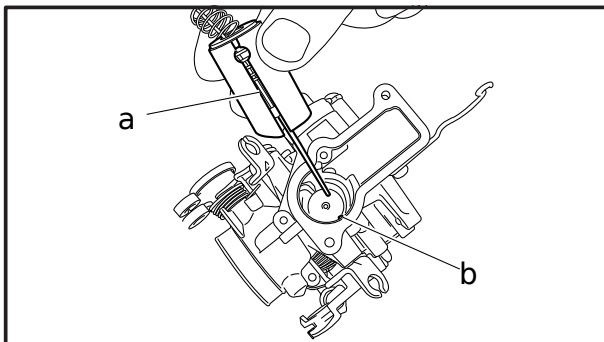
3. Connect:
 - 9fuel hose 1
 - 9carburetor overflow hose 2
 - 9vacuum sensing hose 3
 - 9air vent hose 4
 - 9vacuum sensing hose 5



4. Install:
 - 9carburetor assembly
 - 9intake manifold bolts

10 Nm (1.0 m·kg, 7.2 ft·lb)

- 9clamp screw

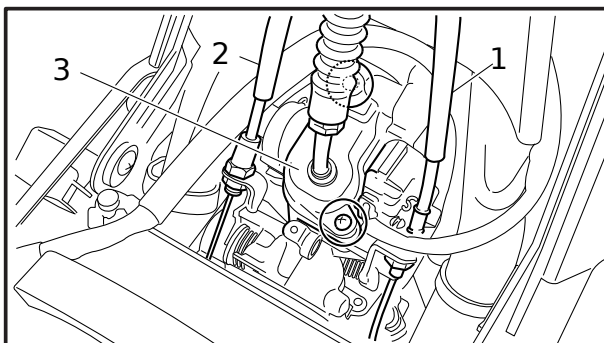


5. Install:
 - 9throttle valve assembly

NOTE:

9Align the slit a of the throttle valve with the tab b of the carburetor body.

9Be careful to fall off the O-ring on the carburetor top cover when installing the throttle valve assembly.



6. Install:
 - 9accelerator pump cable 1
 - 9choke cable 2
 - 9o-ring
 - 9carburetor top cover 3

7. Adjust:
9engine idling speed

Engine idling speed
1,300–1,500 r/min

Refer to “ADJUSTING THE ENGINE IDLING SPEED” in chapter 3.

8. Adjust:
9throttle cable free play

Throttle cable free play (at the
flange of the throttle grip)
3–7 mm (0.12–0.18 in)

Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” in chapter 3.

EAS00916

CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

- NOTE: _____
- 9Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.
- 9Be sure to adjust the angle when removed the throttle position sensor.

1. Check:
9throttle position sensor

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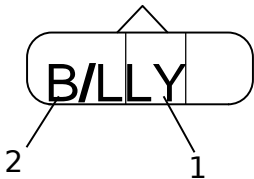
- a. Connect the pocket tester (Ω · 1k) to the terminals of the throttle position sensor.

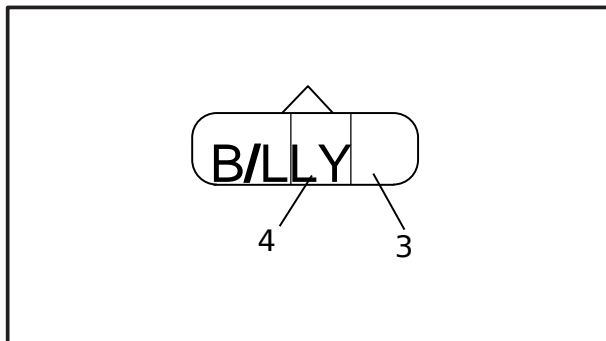
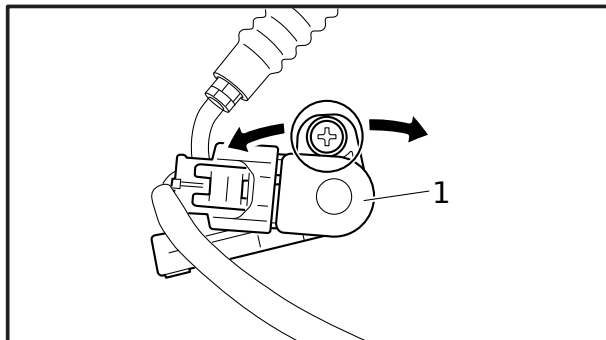
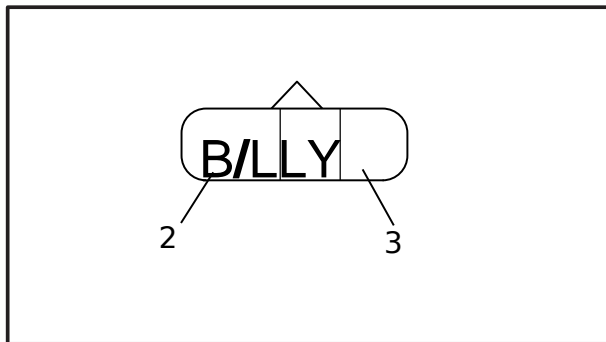
Positive (+) pocket tester probe →→
blue terminal 11

Negative (-) pocket tester probe →→
black/blue terminal 22

- b. Measure the throttle position sensor resistance.
- Out of specification → Replace the throttle position sensor.

Maximum throttle position sensor
resistance
3–7 kΩ at 20 ° C
(blue-black/blue)





- c. Connect the pocket tester (DC20V) to the terminals of the throttle position sensor.

Positive (+) pocket tester probe →→
yellow terminal 3

Negative (-) pocket tester probe →→
black/blue terminal 2



Throttle position sensor input voltage

5V at 20 ° C

(yellow-black/blue)

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2. Adjust:

9throttle position sensor angle

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- a. Connect the digital circuit tester to the throttle position sensor 1 .

Positive (+) digital circuit tester probe →→
blue terminal 4

Negative (-) digital circuit tester probe →→
yellow terminal 3



Digital circuit tester
90890-03174

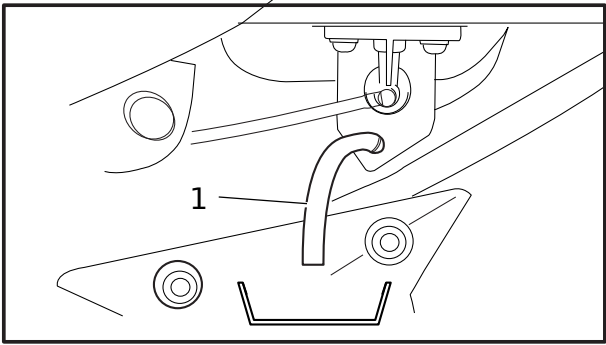
- b. Measure the throttle position sensor voltage.
c. Adjust the throttle position sensor angle so that the voltage is within the specified range.



Throttle position sensor voltage
0.5 V (blue-yellow)

- d. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.

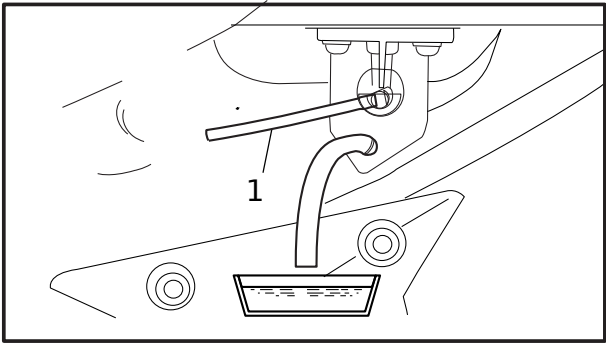
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EAS00506

CHECKING THE FUEL COCK OPERATION

1. Remove:
- 9rear cowling (left)
Refer to “REMOVING THE REAR COWLINGS” in chapter 3.
2. Place a container under the end of the fuel hose 1 .



3. Check:
- 9fuel cock operation
- ★★
- a. Suck on the end of the vacuum hose 1 .

Fuel flows.	Fuel cock is OK.
Fuel does not flow.	Replace the fuel cock.

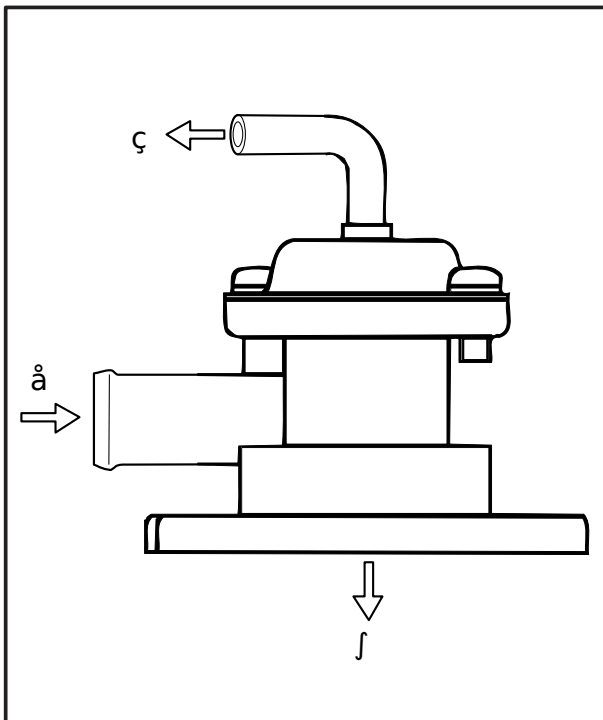
★★

4. Install:
- 9rear cowling (left)
Refer to “INSTALLING THE REAR COWLINGS” in chapter 3.

AIR INDUCTION SYSTEM AIR INJECTION

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons.

When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700 ° C.



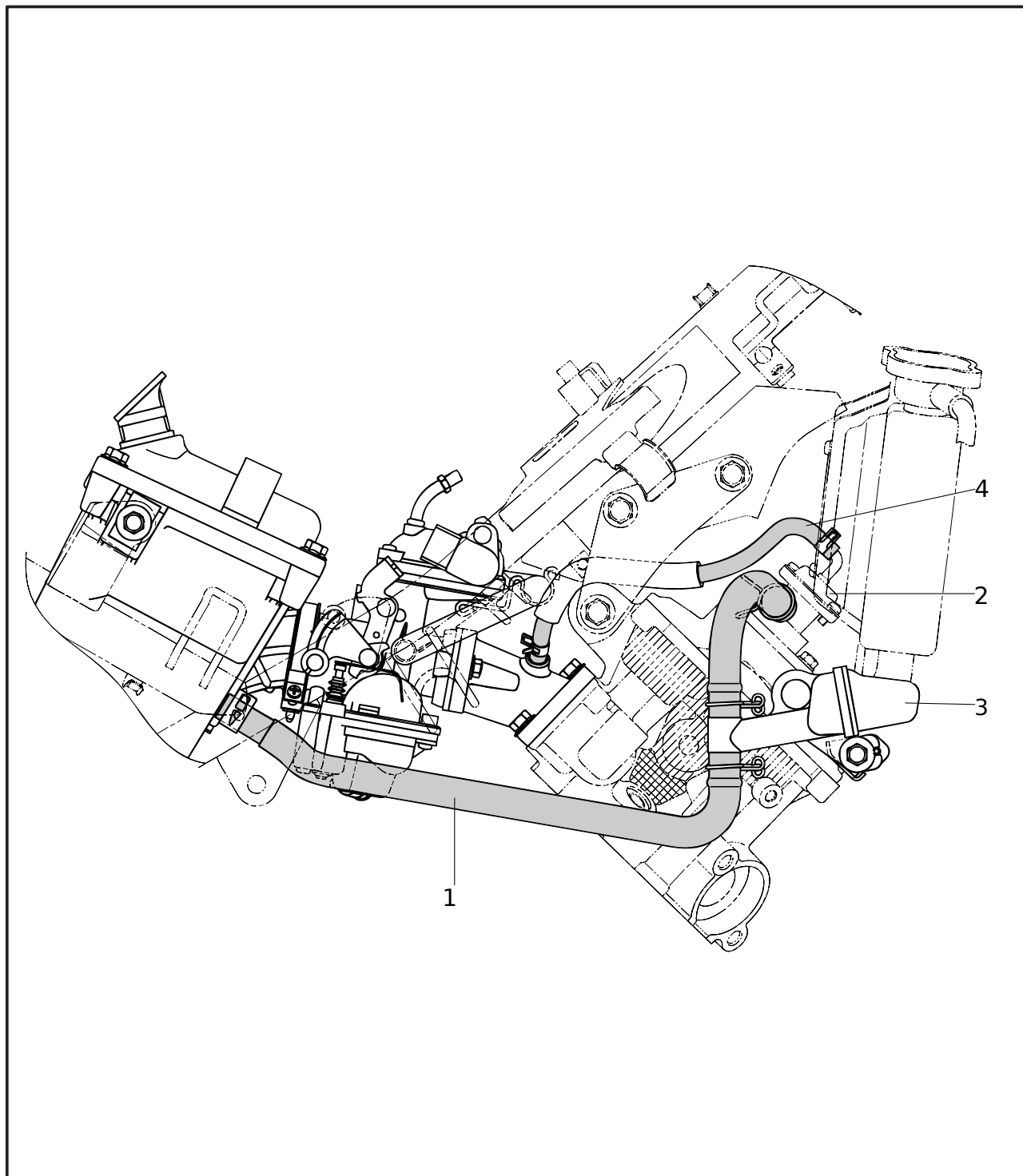
AIR CUT-OFF VALVE

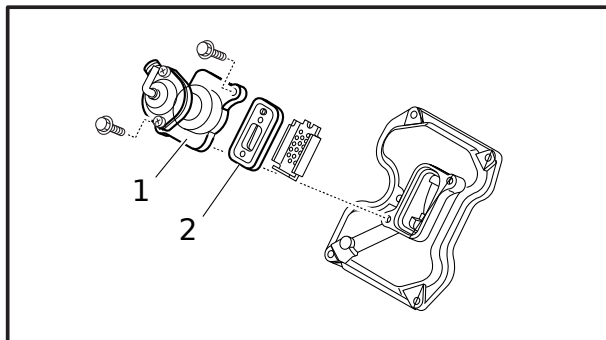
The air cutoff valve is operated by the intake gas pressure through the piston valve diaphragm. Normally, the air cut-off valve is open to allow fresh air to flow into the exhaust port (a to j). During sudden deceleration (the throttle valve suddenly closes), negative pressure (c) is generated and the air cutoff valve is closed in order to prevent after-burning. Additionally, at high engine speeds and when the pressure decreases, the air cut-off valve automatically closes to guard against a loss of performance.

- a From the air filter
- j To the cylinder head
- c To the intake manifold

AIR INDUCTION SYSTEM DIAGRAMS

- 1 Bend hose (air filter case to air cut-off valve)
- 2 Air cut-off valve
- 3 AIS resonator
- 4 Vacuum sensing hose



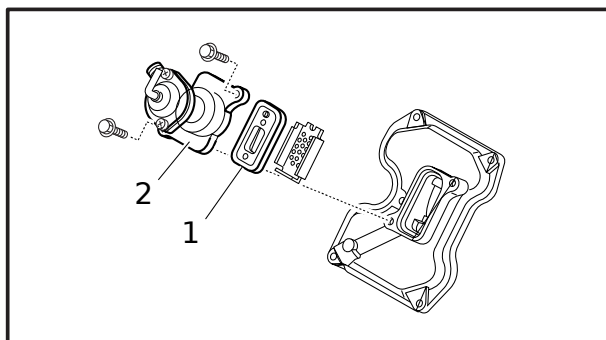
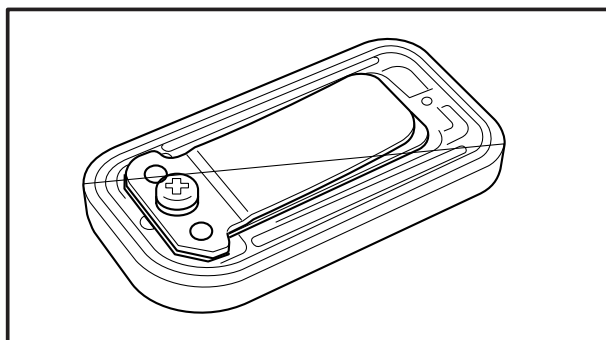


REMOVING THE AIR INDUCTION SYSTEM

1. Disconnect:
 - 9vacuum sensing hose
 - 9bend hose
2. Remove:
 - 9air cut cut-off valve assembly 1
 - 9reed valve assembly 2

CHECKING THE AIR INDUCTION SYSTEM

1. Check:
 - 9hoses
 - Loose connections → Connect properly.
 - Cracks/damage → Replace.
 - 9pipes
 - Cracks/damage → Replace.
2. Check:
 - 9reed valve
 - 9reed valve stopper
 - 9reed valve seat
 - Cracks/damage → Replace the reed valve.
3. Check:
 - 9air cut-off valve
 - Cracks/damage → Replace.



INSTALLING THE AIR INDUCTION SYSTEM

1. Install:
 - 9reed valve assembly 2
 - 9air cut cut-off valve assembly 1

10 Nm (1.0 m·kg, 7.2 ft·lb)

2. Connect:
 - 9vacuum sensing hose
 - 9bend hose

CHAPTER 7

CHASSIS

FRONT WHEELAND BRAKE DISC.....	7-1
REMOVING THE FRONTWHEEL.....	7-2
CHECKING THE FRONTWHEEL.....	7-3
CHECKING THE BRAKE DISC.....	7-5
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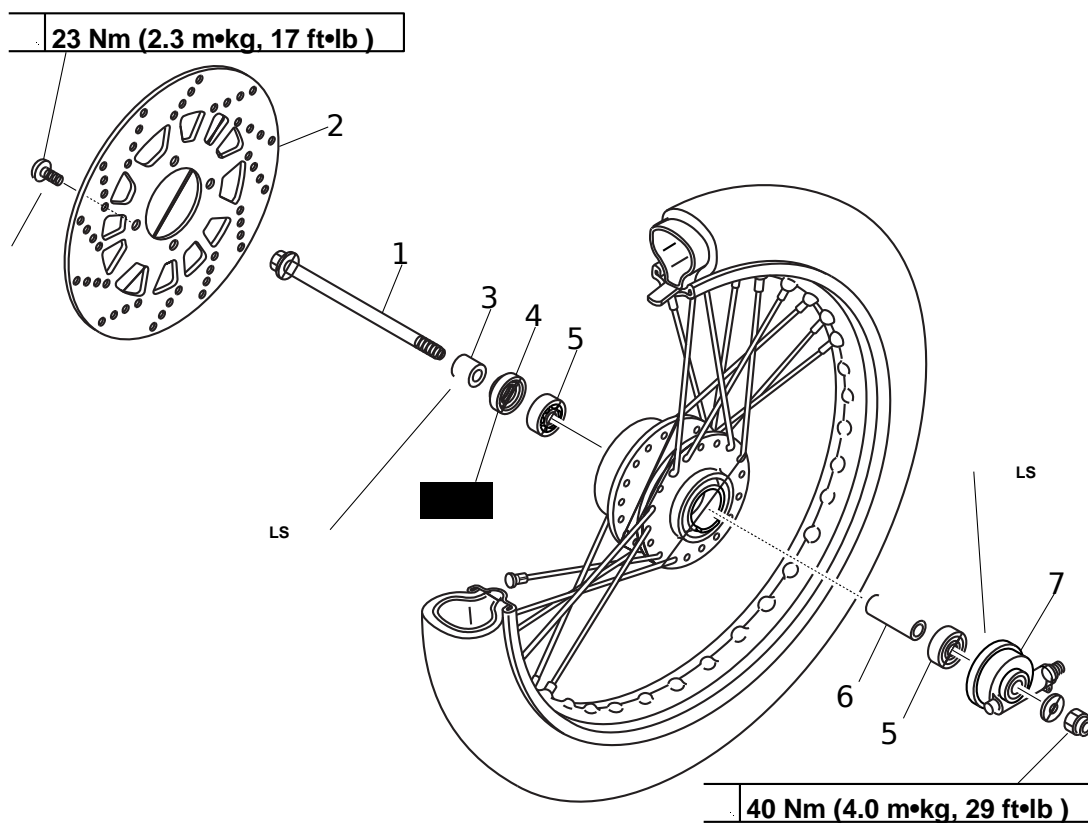
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EASF0044

CHASSIS

FRONT WHEELAND BRAKE DISC

- 1 Front wheel axle
- 2 Brake disc
- 3 Spacer
- 4 Oil seal
- 5 Bearing
- 6 Spacer
- 7 Speedometer gear unit



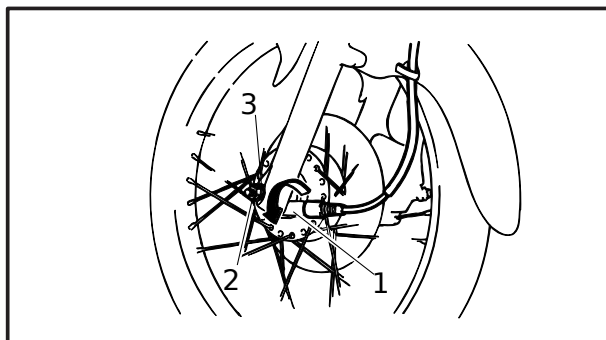
EAS00519

REMOVING THE FRONT WHEEL

1. Stand the vehicle on a level surface.

W

Securely support the vehicle so that there is no danger of it falling over.

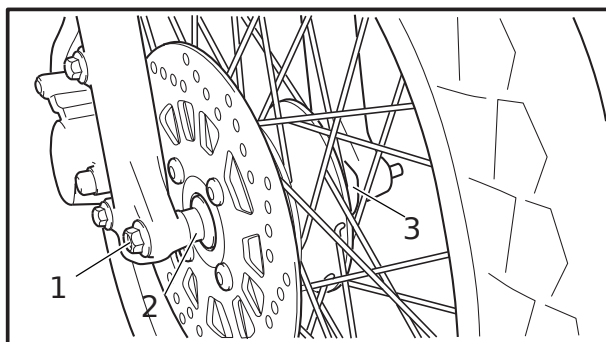


2. Remove:
 - 9speedometer cable 1
 - 9axle nut 2
 - 9washer 3

3. Elevate:
 - 9front wheel

NOTE:

Place the vehicle on a suitable stand so that the front wheel is elevated.



4. Remove:
 - 9front wheel axle 1
 - 9spacer 2
 - 9speedometer gear unit 3
 - 9front wheel

5. Remove:
 - 9brake disc 1



EAS00526

CHECKING THE FRONT WHEEL

1. Check:

9wheel axle

Roll the wheel axle on a flat surface.

Bends → Replace.

W

Do not attempt to straighten a bent wheel axle.

2. Check:

9tire

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" in chapter 3.

3. Check:

9spokes

Bends/damage → Replace.

Loose → Tighten.

Tap the spokes with a screwdriver.

Refer to "CHECKING AND TIGHTENING THE SPOKES" in chapter 3.



4. Measure:

9front wheel radial runout a

9front wheel lateral runout b

Over the specified limits → Replace.

**Front wheel radial runout limit
1.0 mm (0.04 in)**

**Front wheel lateral runout limit
0.5 mm (0.02 in)**



5. Check:
 - 9 spacers
 - Damage/wear → Replace.

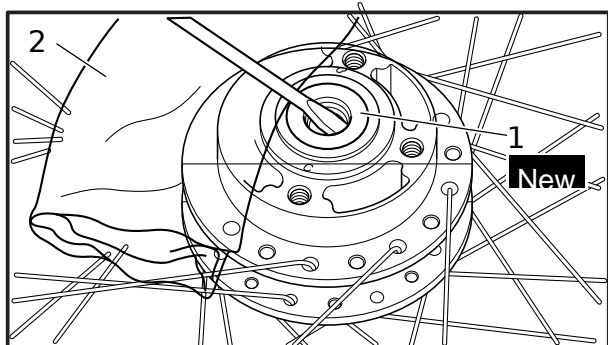
W

9 After mounting a new tire, ride conservatively for a while to become accustomed to the “feel” of the new tire and to allow the tire to seat itself properly in the rim. Failure to do so could lead to an accident with possible injury to the rider or damage to the vehicle.

9 After a tire has been repaired or replaced, be sure to tighten the tire air valve stem locknut 11 properly.



6. Check:
 - 9 wheel bearings
 - Front wheel turns roughly or is loose → Replace the wheel bearings.
 - 9 oil seals
 - Damage/wear → Replace.



7. Replace:
 - 9 wheel bearings
 - 9 oil seals

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- a. Clean the outside of the front wheel hub.
- b. Remove the oil seals 1 with a flat-head screwdriver.

NOTE:

To prevent damaging the wheel, place a rag 2 between the screwdriver and the wheel surface.



- c. Remove the wheel bearings 3 with a general bearing puller.



- d. Install the new wheel bearings and oil seals in the reverse order of disassembly.

cC

Do not contact the wheel bearing inner race 44 or balls 55. Contact should be made only with the outer race 66.

NOTE:

Use a socket 7 that matches the diameter of the wheel bearing outer race and oil seal.

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EAS00527

CHECKING THE BRAKE DISC

1. Check:
 - 9brake disc
 - Damage/galling → Replace.
2. Measure:
 - 9brake disc deflection
 - Out of specification → Correct the brake disc deflection or replace the brake disc.

Brake disc deflection limit (maximum)

0.15 mm (0.0059 in)

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- a. Place the vehicle on a suitable stand so that the front wheel is elevated.
- b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
- c. Remove the brake caliper.
- d. Hold the dial gauge at a right angle against the brake disc surface.
- e. Measure the deflection 5–10 mm below the edge of the brake disc.

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FRONT WHEEL AND BRAKE DISC

CHAS



3. Measure:

9brake disc thickness

Measure the brake disc thickness at a few different locations.

Out of specification → Replace.

Brake disc thickness limit (minimum)

3.0 mm (0.12 in)

4. Adjust:

9brake disc deflection

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- Remove the brake disc.
- Rotate the brake disc by one bolt hole.
- Install the brake disc.

NOTE:

Tighten the brake disc bolts in stages and in a crisscross pattern.

Brake disc bolt

23 Nm (2.3 m·kg, 17 ft·lb)

LOCTITE®

- Measure the brake disc deflection.
- If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
- If the brake disc deflection cannot be brought within specification, replace the brake disc.

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EAS00535

CHECKING THE SPEEDOMETER GEAR UNIT

1. Check:

9speedometer clutch

Bends/damage/wear → Replace.

EAS00542

INSTALLING THE FRONT WHEEL

1. Lubricate:
 - 9 wheel axle
 - 9 wheel bearings
 - 9 oil seal lips
 - 9 speedometer gear unit

Recommended lubricant
Lithium-soap-based grease

2. Install:
 - 9 brake disc
 - 9 front wheel

Refer to "CHECKING THE BRAKE DISC".

NOTE: _____
 Make sure the projection **a** on the speedometer gear unit fits between the projections on the outer tube.

3. Tighten:
 - 9 wheel axle nut

40 Nm (4.0 m.kg, 29 ft-lb)

4. Connect:
 - 9 speedometer cable 1

NOTE: _____
 Be sure that slit **a** on the speedometer cable meshes with the projection **b** on the speedometer gear unit 2 .

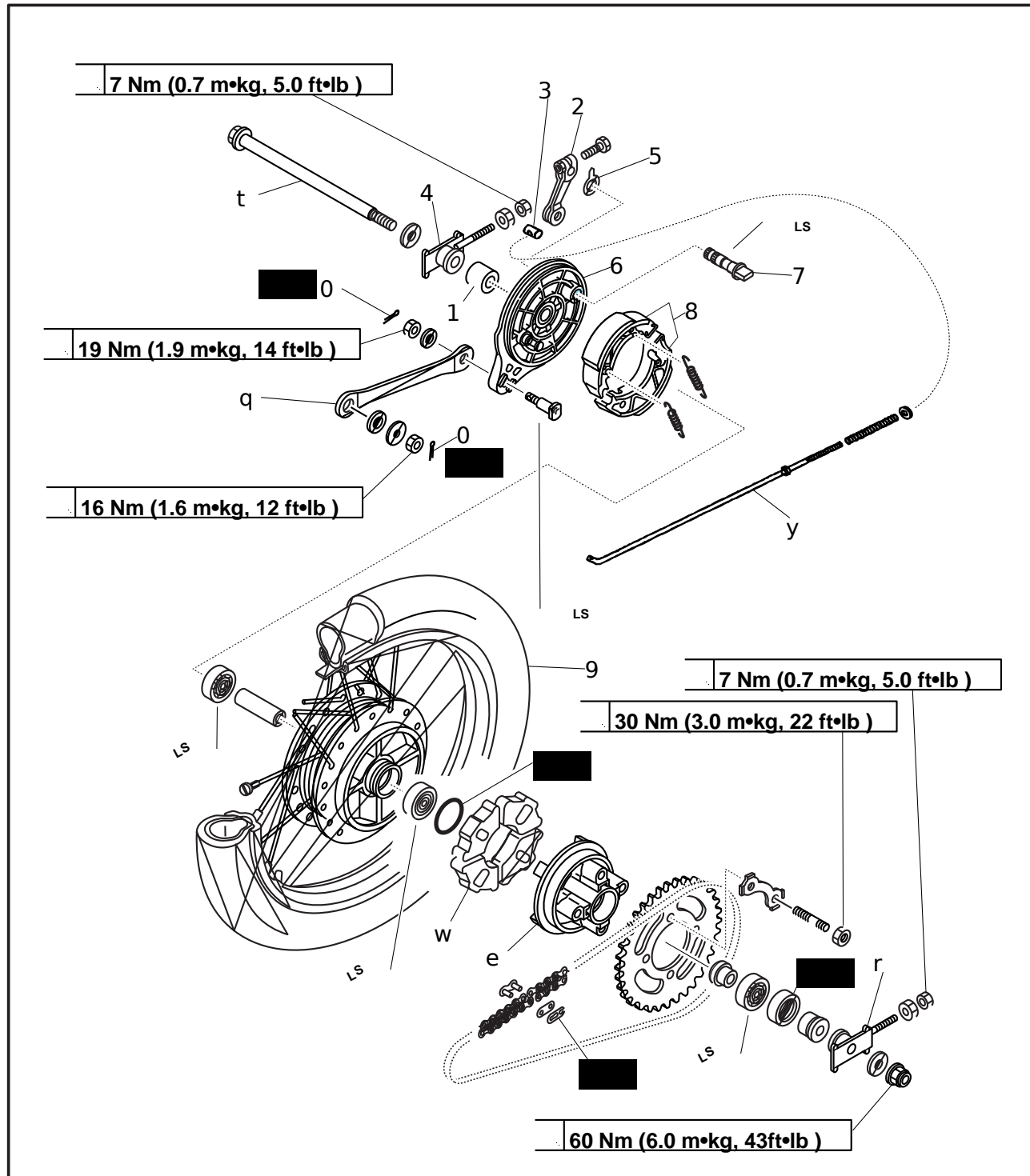
W _____
Make sure the brake cable is routed properly.

cC _____
Before tightening the wheel axle nut, push down hard on the handlebar several times and check if the front fork rebounds smoothly.

EASF0049

REAR WHEEL AND BRAKE

- | | |
|------------------------------|-------------------------------|
| 1 Collar | 0 Cotter pin |
| 2 Brake camshaft lever | q Brake torque rod |
| 3 Pin | w Rear wheel drive hub damper |
| 4 Drive chain puller (right) | e Rear wheel drive hub |
| 5 Brake shoe wear indicator | r Drive chain puller (left) |
| 6 Brake shoe plate | t Rear wheel axle |
| 7 Brake camshaft | y Brake rod |
| 8 Brake shoe | |
| 9 Rear wheel | |



EAS00563

REMOVING THE REAR WHEEL

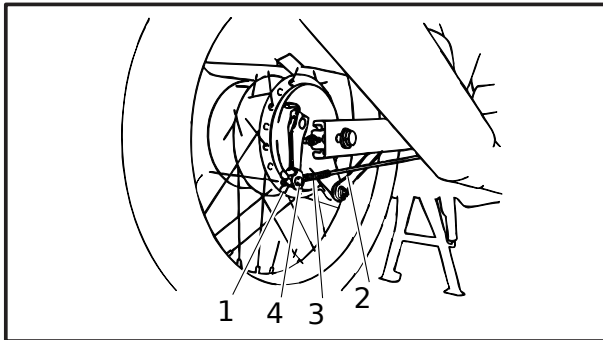
1. Stand the vehicle on a level surface.

W

Securely support the vehicle so that there is no danger of it falling over.

NOTE:

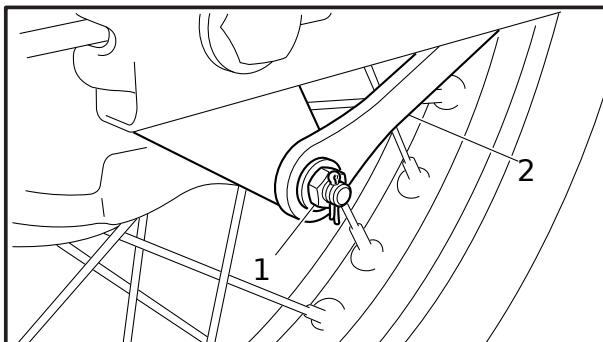
Place the vehicle on a suitable stand so that the rear wheel is elevated.



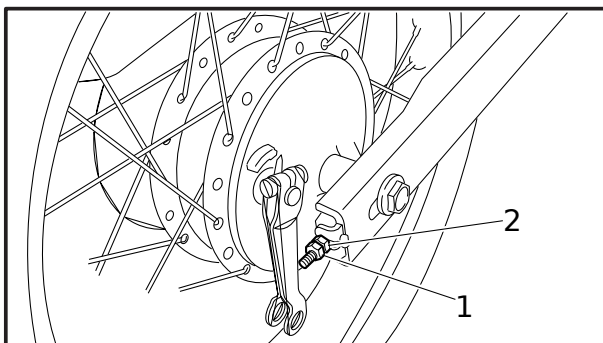
2. Remove:
9brake rod adjusting nut 1
9brake rod 2
9compression spring 3
9washer
9pin 4

NOTE:

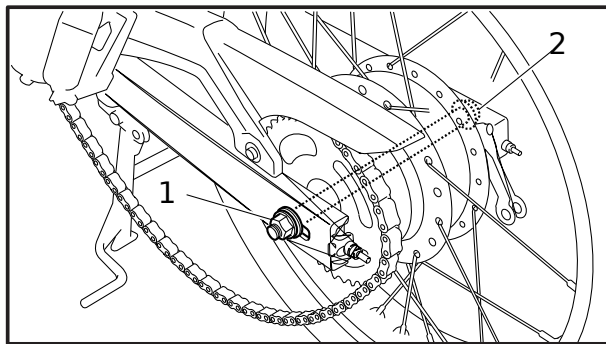
Press down on the brake pedal to remove the pin from the brake rod.



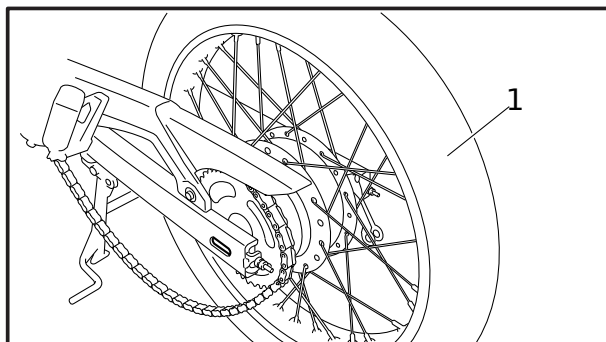
3. Remove:
9cotter pin
9brake torque rod nut 1
9washer
9brake torque rod bolt
9brake torque rod 2



4. Loosen:
9chain puller locknuts (left and right) 1
9chain puller adjusting nuts (left and right) 2



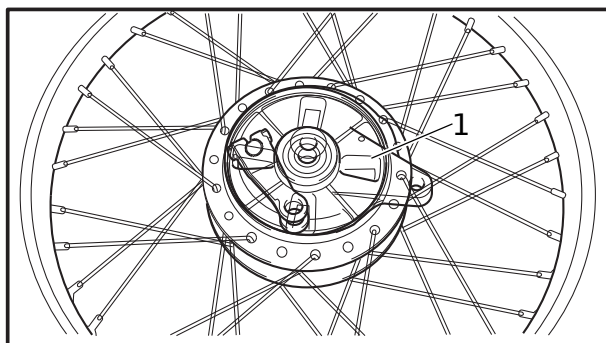
5. Remove:
 - 9rear wheel axle nut 1
 - 9washer
 - 9rear wheel axle 2
 - 9washer
 - 9collar



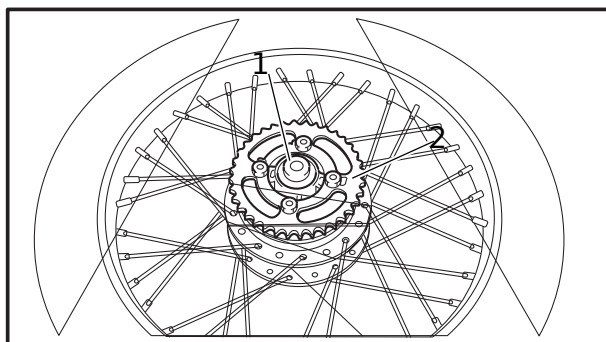
6. Remove:
 - 9rear wheel assembly 1

NOTE:

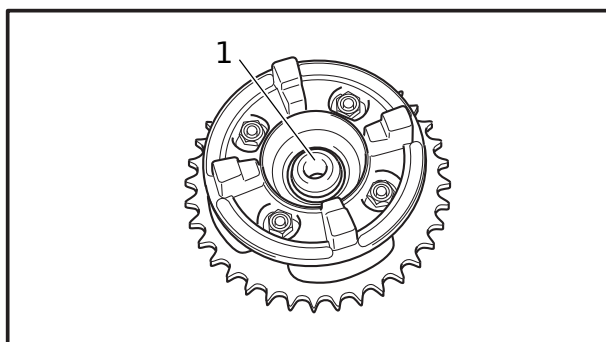
Push the rear wheel forward and remove the drive chain from the driven sprocket.



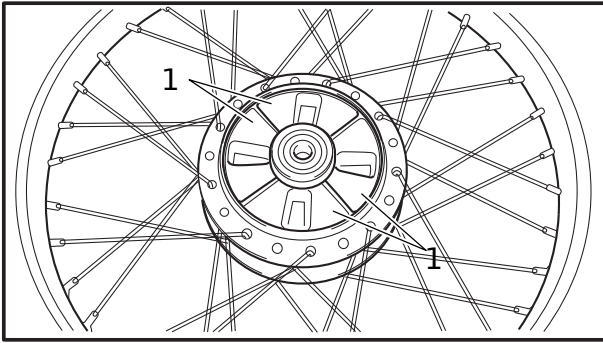
7. Remove:
 - 9brake shoe plate assembly 1



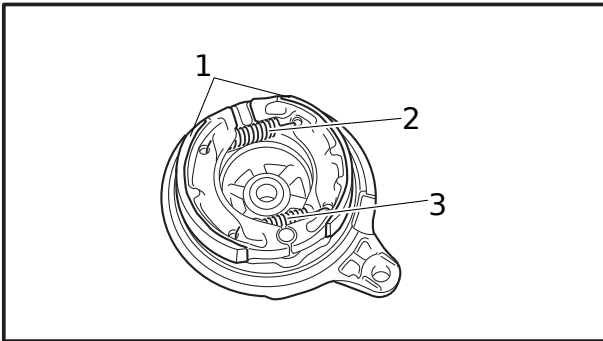
8. Remove:
 - 9collar 1
 - 9rear wheel drive hub assembly 2



9. Remove:
 - 9spacer 1

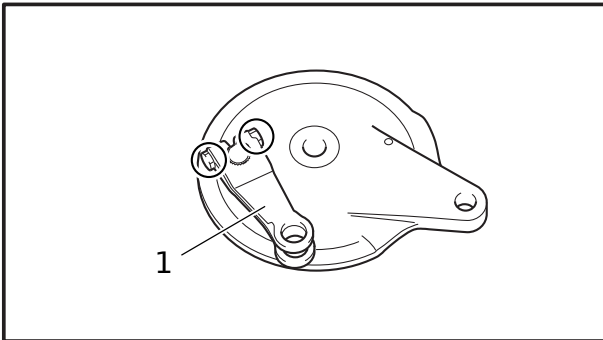


10. Remove:
- 9O-ring
 - 9rear wheel drive hub dampers 1



DISASSEMBLING THE BRAKE SHOE PLATE

1. Remove:
- 9brake shoes 1
 - 9brake shoe springs 2 (48 mm, 1.89 in)
 - 9brake shoe springs 3 (52 mm, 2.01 in)



2. Remove:
- 9brake camshaft lever nut
 - 9brake camshaft lever bolt
 - 9brake camshaft lever 1
 - 9brake shoe wear indicator
 - 9brake camshaft

NOTE:

When removing the brake camshaft lever, mark the position on the brake camshaft lever where it is aligned with the punch mark in the brake camshaft.

EAS00566

CHECKING THE REAR WHEEL

1. Check:
- 9wheel axle
 - 9rear wheel
 - 9wheel bearings
 - 9oil seals
- Refer to "FRONTWHEELAND BRAKE DISC".

2. Check:

9tire

Damage/wear → Replace.

Refer to “CHECKING THE TIRES” in chapter 3.

3. Measure:

9radial wheel runout

9lateral wheel runout

Refer to “FRONTWHEELAND BRAKE DISC”.

EAS00567

CHECKING THE REAR WHEELDRIVE HUB

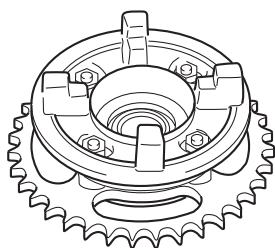
1. Check:

9rear wheel drive hub

Cracks/damage → Replace.

9rear wheel drive hub dampers

Damage/wear → Replace.



EAS00539

CHECKING THE BRAKE

The following procedure applies to all of the brake shoes.

1. Check:
 - 9brake shoe lining
 - Glazed areas → Repair.
 - Sand the glazed areas with coarse sandpaper.

NOTE: _____

After sanding the glazed areas, clean the brake shoe with a cloth.

2. Measure:
 - 9brake shoe lining thickness a
 - Out of specification → Replace.

Brake shoe lining thickness limit (minimum)
2.0 mm (0.08 in)

W _____

Do not allow oil or grease to contact the brake shoes.

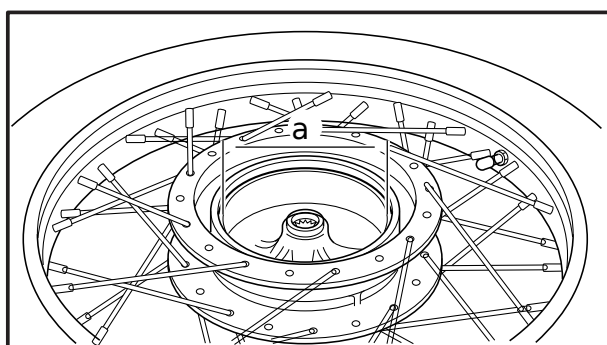
NOTE: _____

Replace the brake shoes as a set, if either is worn to the wear limit.

3. Measure:
 - 9brake drum inside diameter a
 - Out of specification → Replace the wheel.

Brake drum inside diameter limit (maximum)
131 mm (5.16 in)

4. Check:
 - 9brake drum inner surface
 - Oil deposits → Clean.
 - Remove the oil with a rag soaked in lacquer thinner or solvent.
 - Scratches → Repair.
 - Lightly and evenly polish the scratches with an emery cloth.
5. Check:
 - 9brake camshaft
 - Damage/wear → Replace.





EAS00570

ASSEMBLING THE BRAKE SHOE PLATE

- 1. Install:
 - 9brake camshaft 1
 - 9brake shoe wear indicator 2
 - 9brake camshaft lever

7 Nm (0.7 m·kg, 5.0 ft·lb)

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- a. Install the brake camshaft so its punch mark a is positioned as shown.
 - b. Align the projection b on the brake shoe wear indicator with the notch in the brake camshaft.
 - c. Align the punch mark in the brake camshaft with the mark on the brake camshaft lever.
 - d. Check that the brake shoes are properly positioned.

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EAS00571

INSTALLING THE REAR WHEEL

- 1. Lubricate:
 - 9spacer
 - 9collar
 - 9wheel axle 1
 - 9wheel bearings
 - 9rear brake camshaft
 - 9brake torque rod bolt
 - 9oil seal lips

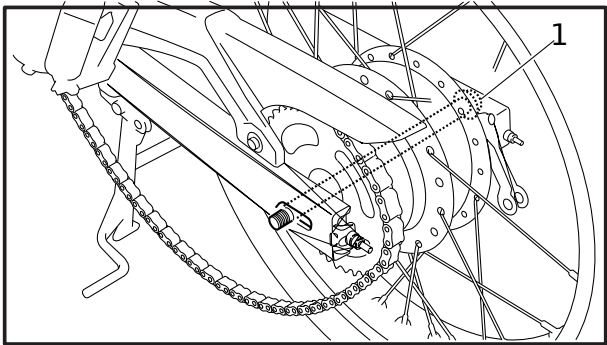
	Recommended lubricant Lithium-soap-based grease
--	--

- 2. Install:
 - 9brake torque rod (to brake shoe plate)

19 Nm (1.9 m·kg, 14 ft·lb)

- 9washer
- 9cotter pin
- 3. Install:
 - 9pin
 - 9washer
 - 9compression spring
 - 9brake rod
 - 9brake rod adjusting nut

NOTE: _____
Press down on the brake pedal to install the brake rod.



4. Adjust:

9drive chain slack

Drive chain slack

25–35 mm (0.98–1.38 in)

Refer to “ADJUSTING THE DRIVE CHAIN SLACK” in chapter 3.

5. Tighten:

9wheel axle nut

60 Nm (6.0 m·kg, 43 ft·lb)

C

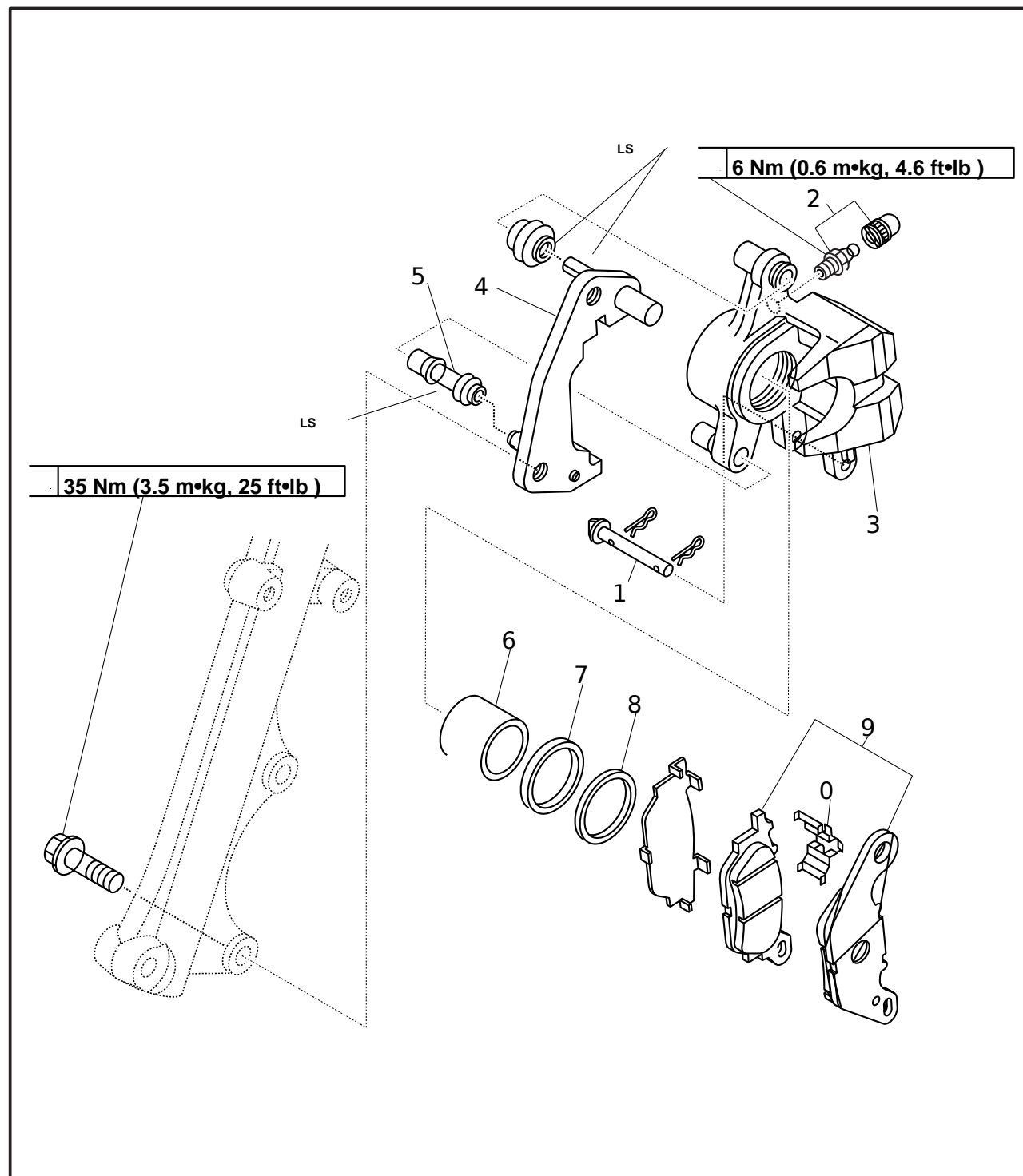
Do not loosen the wheel axle nut after tightening it to the specified torque.

FRONT BRAKE

EASF0052

FRONT BRAKE CALIPER

- | | | | |
|---|------------------------------------|---|---------------------------|
| 1 | Brake pad retaining pin | 8 | Brake caliper piston seal |
| 2 | Air bleed screw | 9 | Brake pad |
| 3 | Brake caliper | 0 | Brake pad spring |
| 4 | Brake caliper bracket | | |
| 5 | Lower brake caliper retaining bolt | | |
| 6 | Brake caliper piston | | |
| 7 | Brake caliper dust seal | | |



EAS00579

cC

Disc brake components rarely require disassembly.

Therefore, always follow these preventive measures:

- 9 Never disassemble brake components unless absolutely necessary.
- 9 If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- 9 Never use solvents on internal brake components.
- 9 Use only clean or new brake fluid for cleaning brake components.
- 9 Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- 9 Avoid brake fluid coming into contact with the eyes as it can cause serious injury.

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

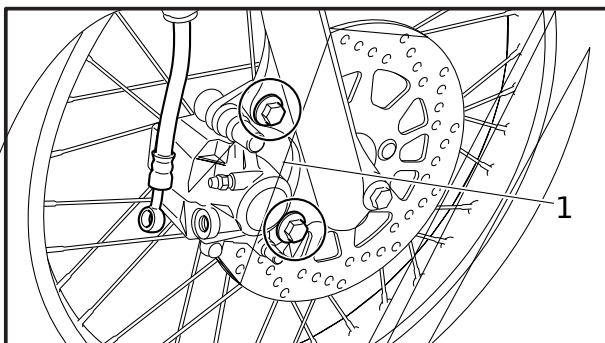
- 9 Flush with water for 15 minutes and get immediate medical attention.

EAS00581

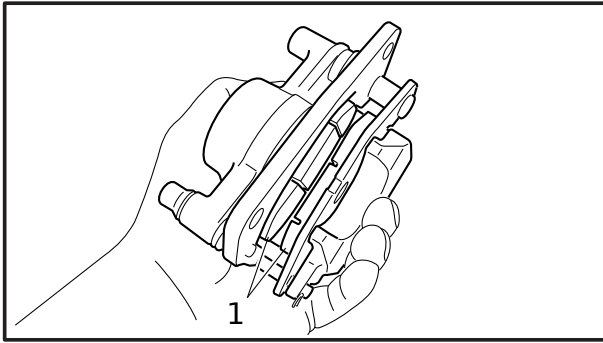
REPLACING THE FRONT BRAKE PADS

NOTE:

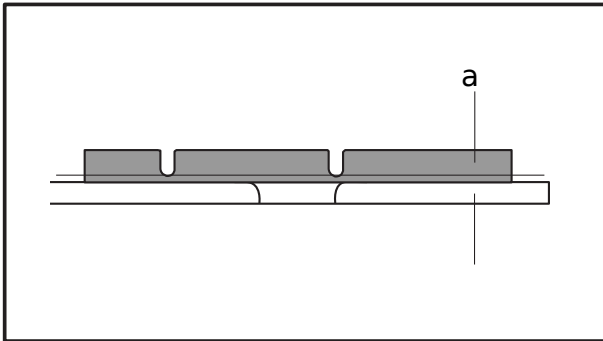
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



1. Remove:
 - 9 brake caliper bolts
 - 9 brake caliper 1

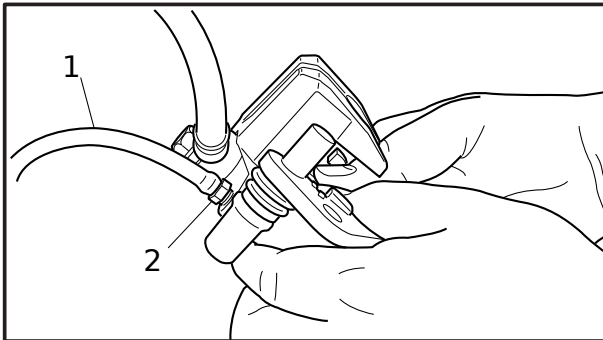


2. Remove:
 - 9clips
 - 9brake pad retaining pin
 - 9brake pads 1
 - 9brake pad spring



3. Measure:
 - 9brake pad wear limit a
 Out of specification → Replace the brake pads as a set.

	Brake pad wear limit 0.8 mm (0.03 in)
--	--



4. Install:
 - 9brake pad spring
 - 9brake pads

NOTE: Always install new brake pads and a new brake pad spring as a set.

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- a. Connect a clear plastic hose 1 tightly to the bleed screw 2. Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- c. Tighten the bleed screw.

	Bleed screw 6 Nm (0.6 m·kg, 4.3 ft·lb)
--	---

- d. Install new brake pads and a new brake pad spring.

NOTE: Make sure the brake pad spring is installed correctly as shown.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

5. Lubricate:

9brake pad retaining pin

Recommended lubricant

Lithium-soap-based grease

cC

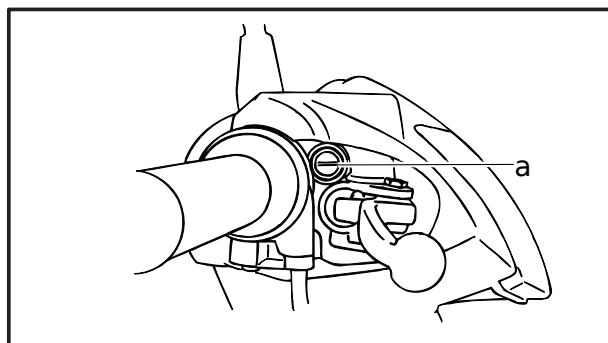
9Do not allow grease to contact the brake pads.

9Remove any excess grease.

6. Install:

9brake caliper bolts

35 Nm (3.5 m·kg, 25 ft·lb)



7. Check:

9brake fluid level

Below the minimum level mark **a** → Add the recommended brake fluid to the proper level.

Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

8. Check:

9brake lever operation

Soft or spongy feeling → Bleed the brake system.

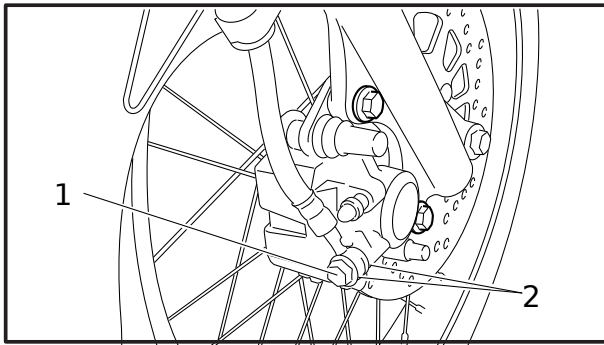
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

EAS00619

DISASSEMBLING THE FRONT BRAKE CALIPER

NOTE:

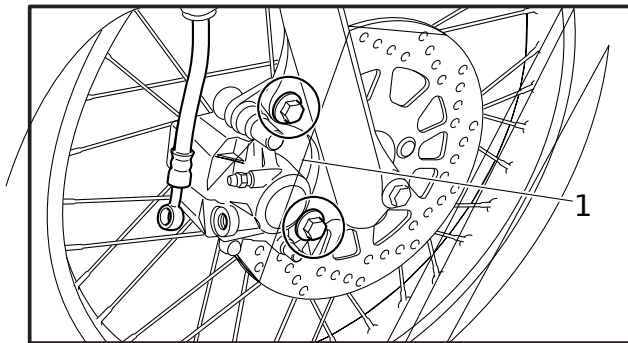
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.



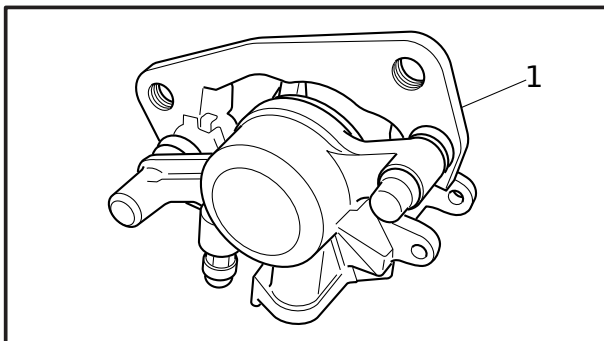
1. Remove:
 - 9union bolt 1
 - 9copper washers 2
 - 9brake hose

NOTE:

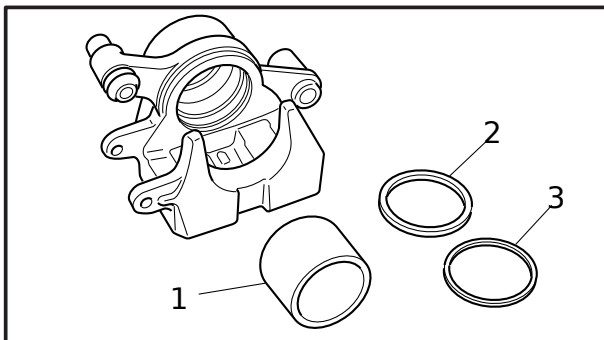
Put the end of the brake hose into a container and pump out the brake fluid carefully.



2. Remove:
 - 9brake caliper 1
 - 9pin
 - 9brake pad retaining pin
 - 9brake pads
 - 9brake pad spring



3. Remove:
 - 9brake caliper bracket 1



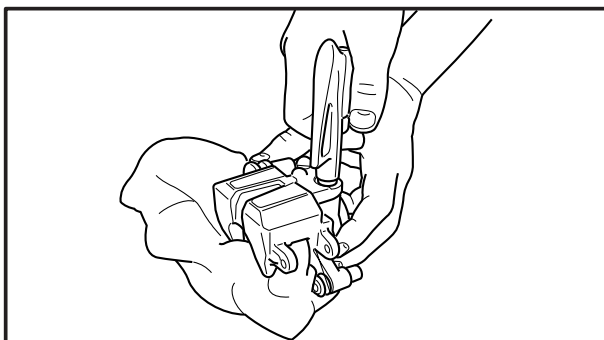
4. Remove:
 - 9brake caliper piston 1
 - 9brake caliper piston seal 2
 - 9brake caliper dust seal 3

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- a. Blow compressed air into the brake hose joint opening to force out the piston from the brake caliper.

W

- 9ⓘ Cover the brake caliper piston with a rag. Be careful not to get injured when the piston are expelled from the brake caliper.
- 9ⓘ Never try to pry out the brake caliper piston.



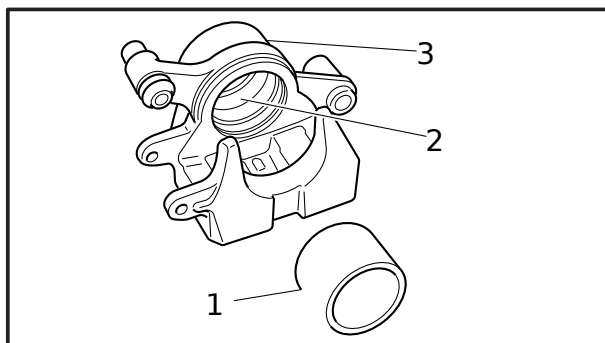
- b. Remove the brake caliper piston seal and brake caliper dust seal.

★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

EAS00631

CHECKING THE FRONT BRAKE CALIPER

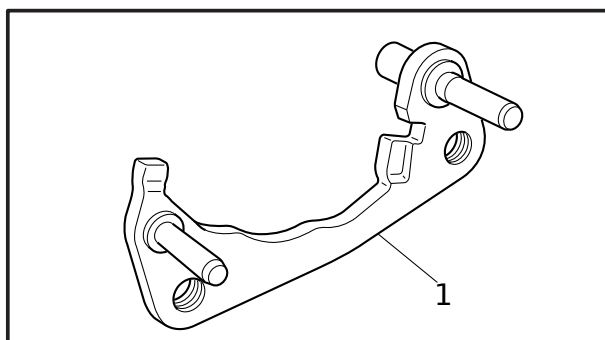
Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seal	Every two years
Brake hose	Every four years
Brake fluid	Every two years and whenever the brake is disassembled



1. Check:
 - 9brake caliper piston 1
Rust/scratches/wear → Replace the brake caliper pistons.
 - 9brake caliper cylinder 2
Scratches/wear → Replace the brake caliper assembly.
 - 9brake caliper body 3
Cracks/damage → Replace the brake caliper assembly.
 - 9brake fluid delivery passages (brake caliper body)
Obstructions → Blow out with compressed air.

W

Whenever a brake caliper is disassembled, replace the piston seals.



2. Check:
 - 9brake caliper bracket 1
Cracks/damage → Replace.

EAS00634

ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER

W

- 9 Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- 9 Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- 9 Whenever a brake caliper is disassembled, replace the brake caliper piston seals.

Recommended brake fluid DOT 3 or 4

1. Install:

9 brake caliper 1

(temporarily)

9 copper washers

9 brake hose 2

9 union bolt 3

26 Nm (2.6 m·kg, 19 ft·lb)

W

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING".

cC

When installing the brake hose onto the brake caliper 1, make sure the brake pipe aa touches the projection bb on the brake caliper.

2. Remove:

9 brake caliper

3. Install:

9 brake pad springs

9 brake pads

9 brake pad retaining pin

9 brake caliper

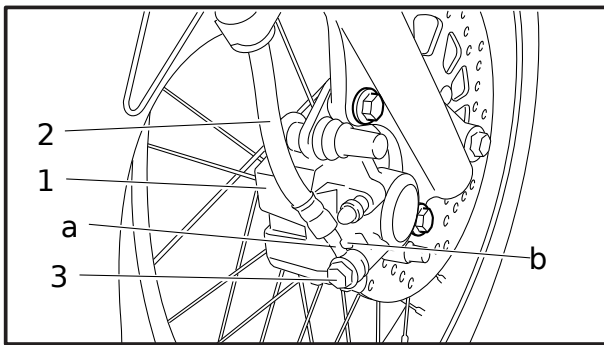
35 Nm (3.5 m·kg, 25 ft·lb)

Refer to "REPLACING THE FRONTBRAKE PADS".

4. Remove:

9 headlight assembly

Refer to "REMOVING THE HEADLIGHT ASSEMBLY" in chapter 3.



5. Fill:

- 9 brake master cylinder reservoir
(with the specified amount of the recommended brake fluid)

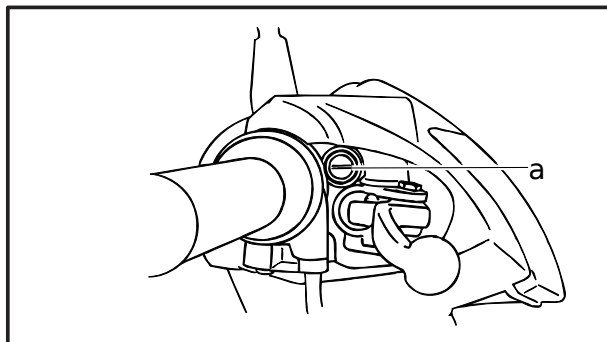
Recommended brake fluid DOT 3 or 4

W

- 9 Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- 9 Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- 9 When refilling, be careful that water does not enter the brake master cylinder reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

cC

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



6. Bleed:

- 9 brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

7. Check:

- 9 brake fluid level
Below the minimum level mark a → Add the recommended brake fluid to the proper level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

8. Check:

- 9 brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

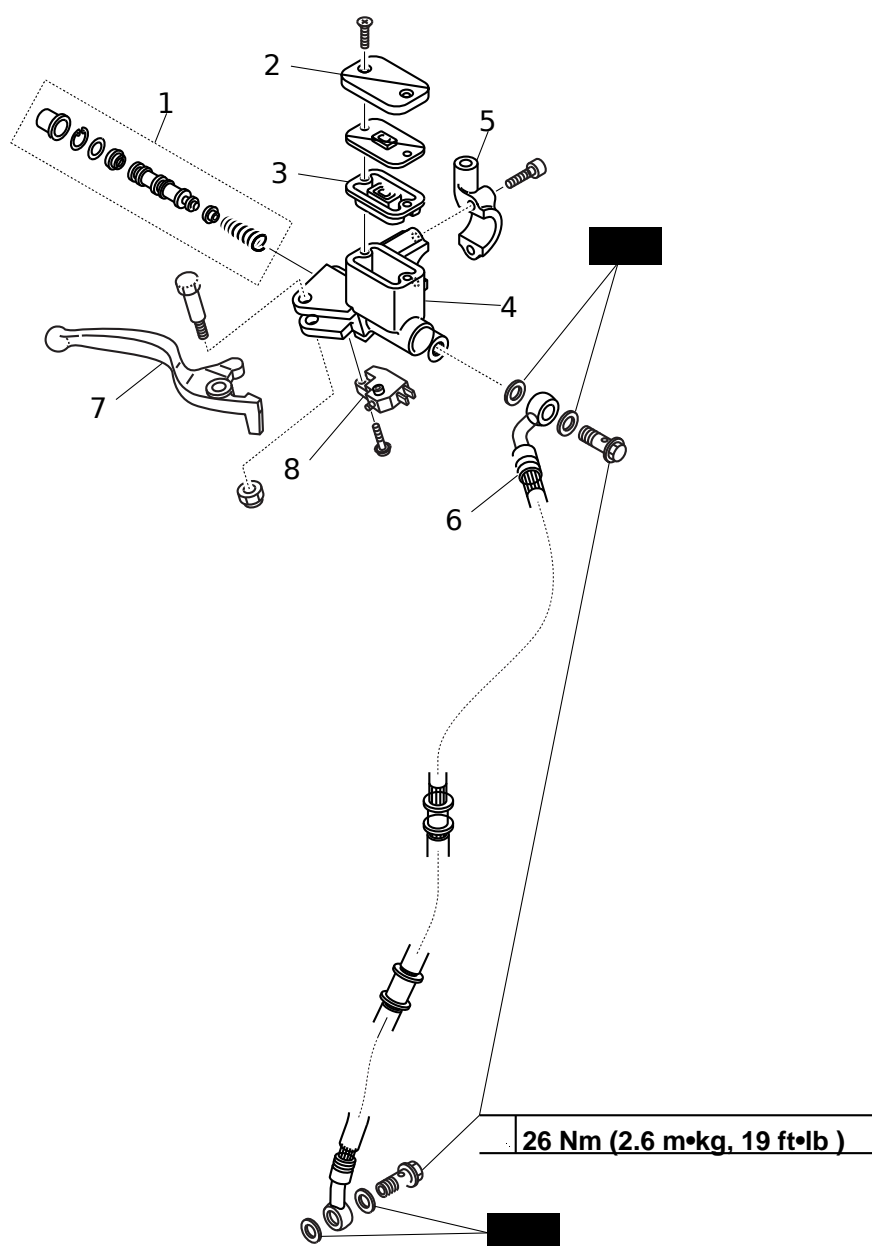
9. Install:

- 9 headlight assembly
Refer to "REMOVING THE HEADLIGHT ASSEMBLY" in chapter 3.

EASF0050

FRONT BRAKE MASTER CYLINDER

- 1 Brake master cylinder kit
- 2 Brake master cylinder reservoir cap
- 3 Brake master cylinder reservoir diaphragm
- 4 Brake master cylinder
- 5 Brake master cylinder holder
- 6 Brake hose
- 7 Brake lever
- 8 Front brake light switch



EAS00588

DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

NOTE:

Before disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:

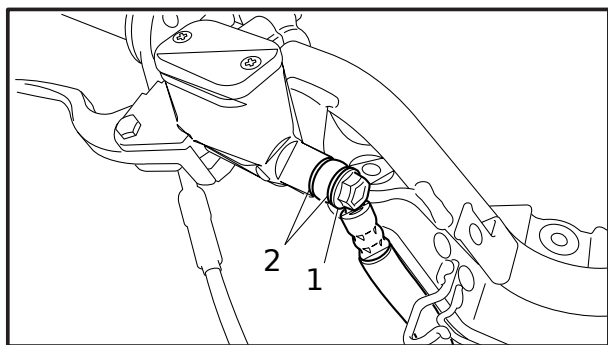
9side cowlings (left and right)

9front cowling

Refer to "REMOVING THE SIDE COWLINGS" and "REMOVING THE FRONT COWLING" in chapter 3.

9headlight assembly

Refer to "REMOVING THE HEADLIGHT ASSEMBLY" in chapter 3.



2. Remove:

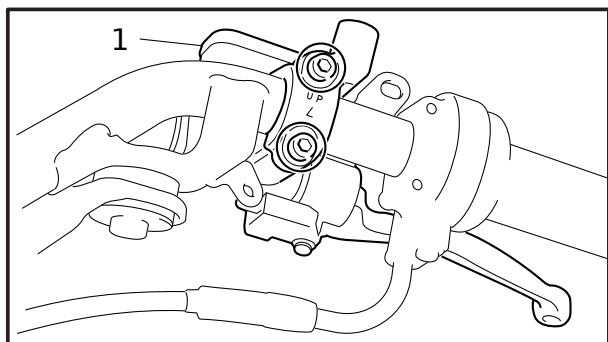
9union bolt 1

9copper washers 2

9brake hose

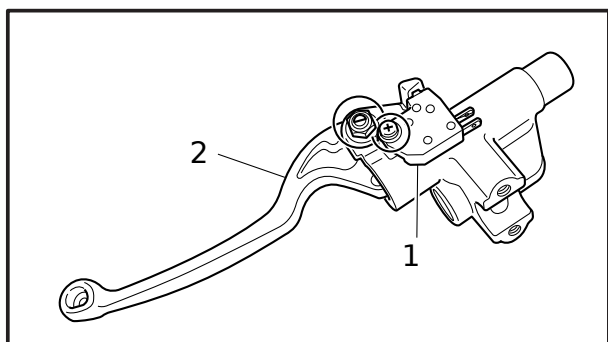
NOTE:

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



3. Remove:

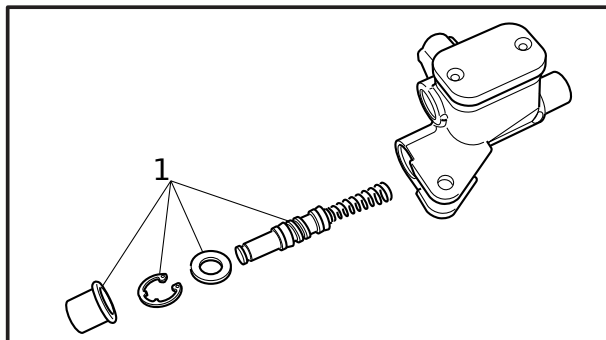
9brake master cylinder assembly 1



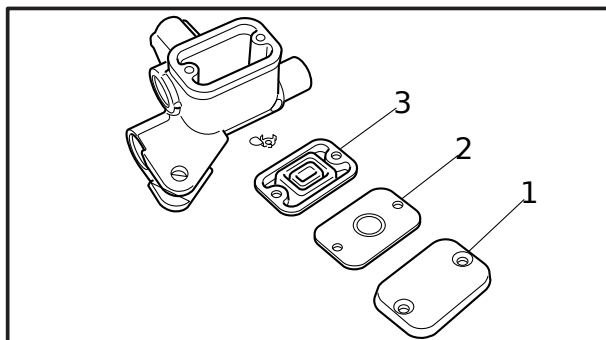
4. Remove:

9brake light switch 1

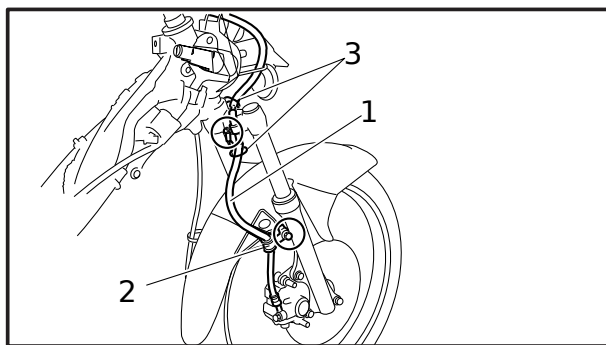
9brake lever 2



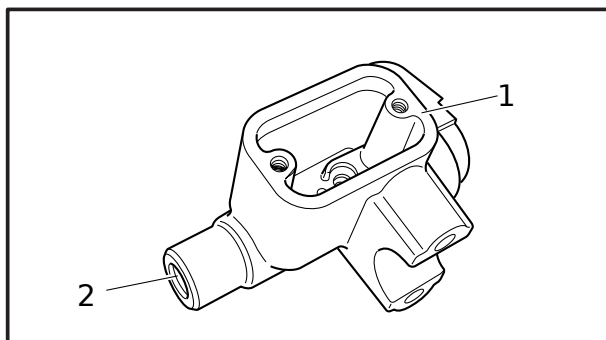
5. Remove:
9brake master cylinder kit 1



6. Remove:
9brake master cylinder reservoir cap 1
9brake master cylinder reservoir diaphragm holder 2
9brake master cylinder reservoir diaphragm 3



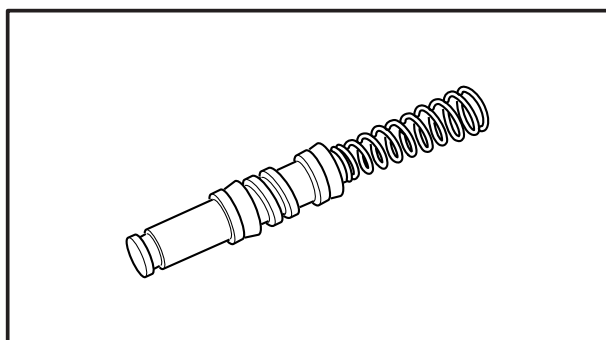
7. Remove:
9brake hose 1
9brake hose clamp 2
9brake hose holder 3

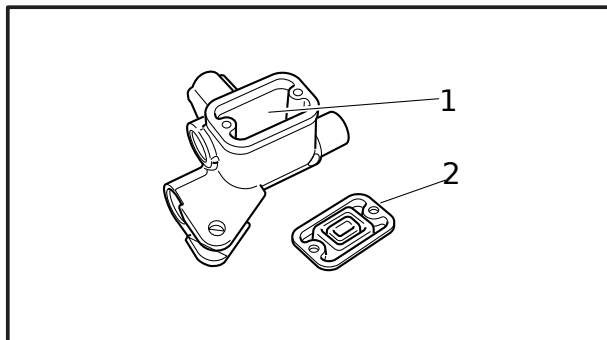


EAS00590

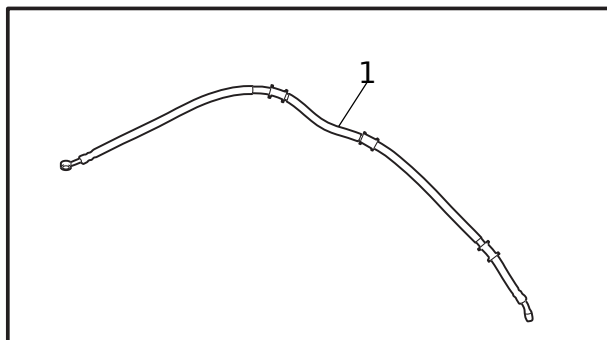
CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
9brake master cylinder 1
Damage/scratches/wear → Replace.
9brake fluid delivery passages 2
(brake master cylinder body)
Obstructions → Blow out with compressed air.
2. Check:
9brake master cylinder kit
Damage/scratches/wear → Replace.





3. Check:
 - 9 brake master cylinder reservoir 1
Cracks/damage → Replace.
 - 9 brake master cylinder reservoir diaphragm 2
Damage/wear → Replace.



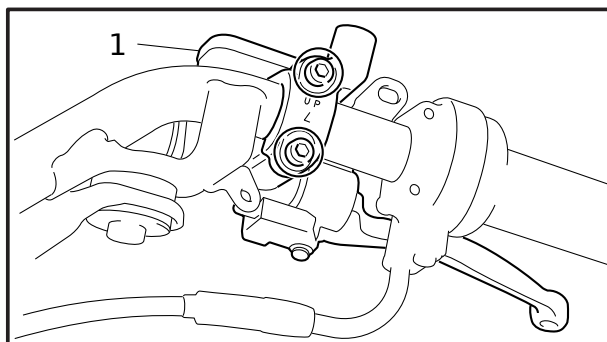
4. Check:
 - 9 brake hose 1
Cracks/damage/wear → Replace.

EAS00598

ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

W

- 9 Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- 9 Never use solvents on internal brake components.



	Recommended brake fluid DOT 3 or 4
--	---

1. Install:
 - 9 brake master cylinder 1

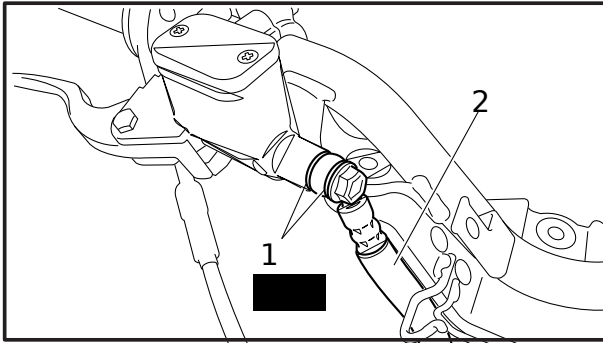
11 Nm (1.1 m·kg, 8.0 ft·lb)

NOTE:

- 9 Install the brake master cylinder holder with the mark facing up.
- 9 Adjust the brake master cylinder to the proper angle.
- 9 First, tighten the upper bolt, then the lower bolt.

FRONT BRAKE

CHAS



2. Install:

9copper washers 1

9brake hose 2

9union bolt

26 Nm (2.6 m·kg, 19 ft·lb)

W

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING".

NOTE:

Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.

3. Fill:

9brake master cylinder reservoir
(with the specified amount of the recommended brake fluid)

Recommended brake fluid
DOT 3 or 4

W

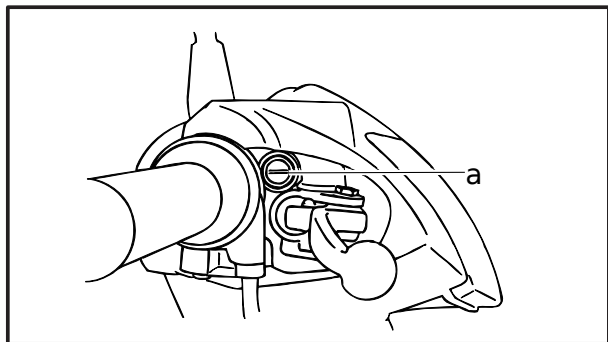
9Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.

9Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.

9When refilling, be careful that water does not enter the brake master cylinder reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

cC

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

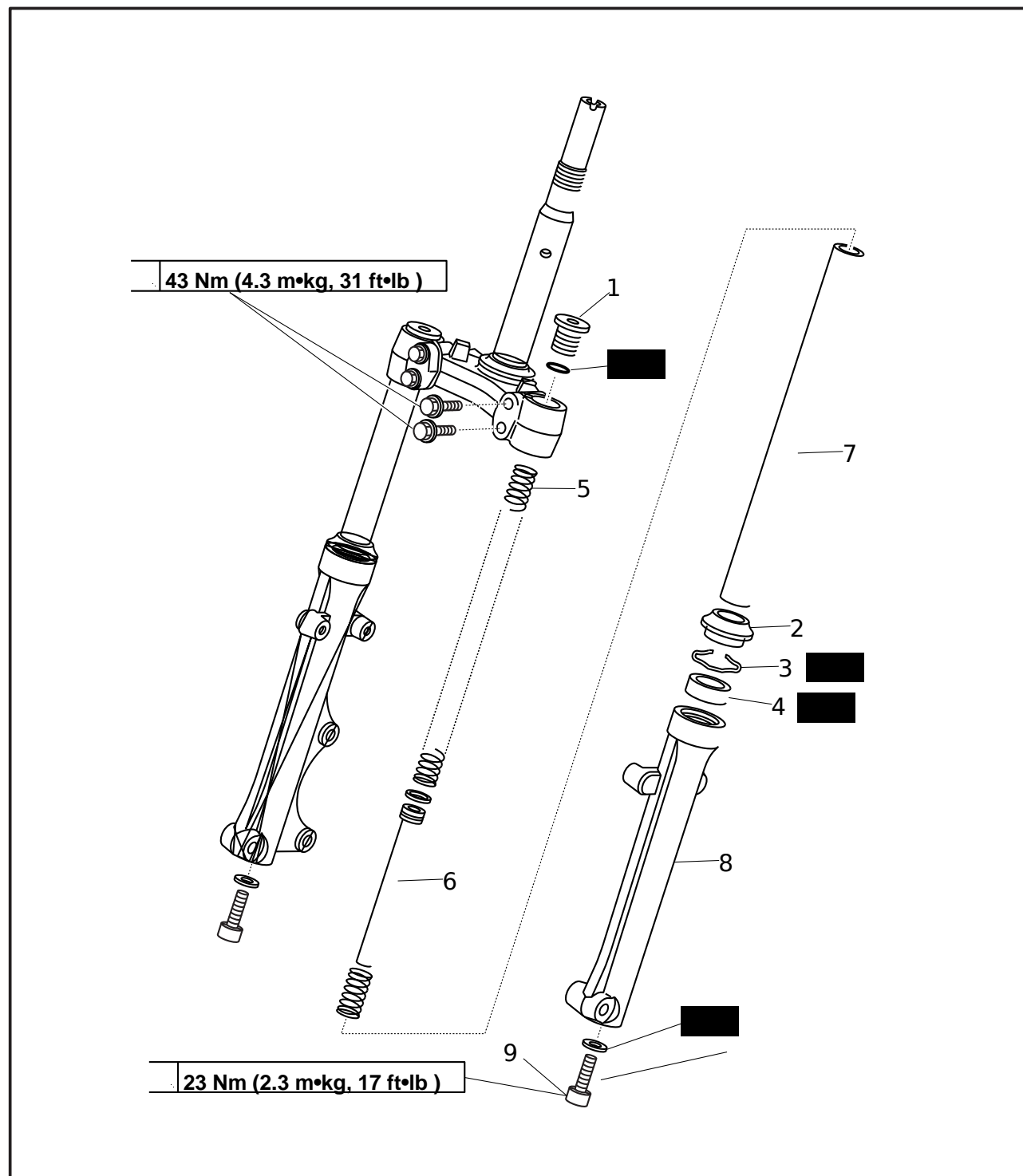


4. Bleed:
 - 9brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
5. Check:
 - 9brake fluid level
Below the minimum level mark a → Add the recommended brake fluid to the proper level.
Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
6. Check:
 - 9brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

EASF0054

FRONT FORK

- 1 Front fork cap bolt
- 2 Dust seal
- 3 Oil seal clip
- 4 Oil seal
- 5 Fork spring
- 6 Damper rod
- 7 Inner tube
- 8 Outer tube
- 9 Damper rod bolt



EAS00649

REMOVING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Stand the vehicle on a level surface.

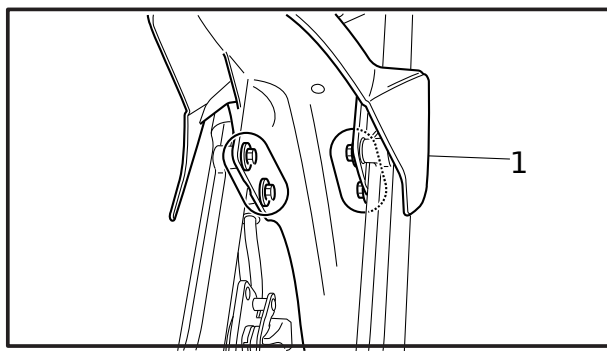
W

Securely support the vehicle so that there is no danger of it falling over.

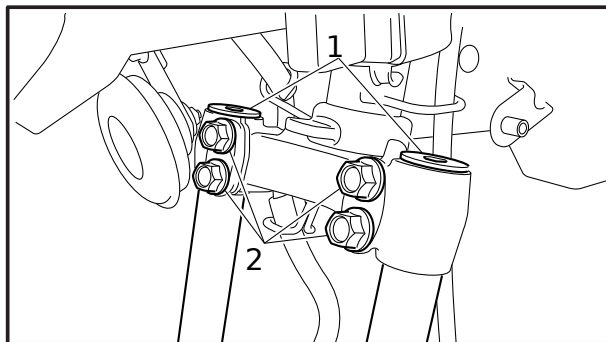
NOTE:

Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Remove:
 - 9side cowlings (left and right)
 - 9front cowling
 - 9center panels
 - 9inner panel
 - Refer to "COVERS" in chapter 3.
3. Remove:
 - 9brake caliper assembly
 - 9brake hose clamp
 - Refer to "FRONTBRAKE".
 - 9front wheel
 - Refer to "FRONTWHEELAND BRAKE DISC".



4. Remove:
 - 9front fender bolts
 - 9washers
 - 9collars
 - 9front fender 1



5. Remove:
 - 9front fork cap bolt 1
(with a 10-mm hexagonal wrench)
6. Loosen:
 - 9lower bracket pinch bolt 2

W

Before loosening the lower bracket pinch bolt, support the front fork leg.

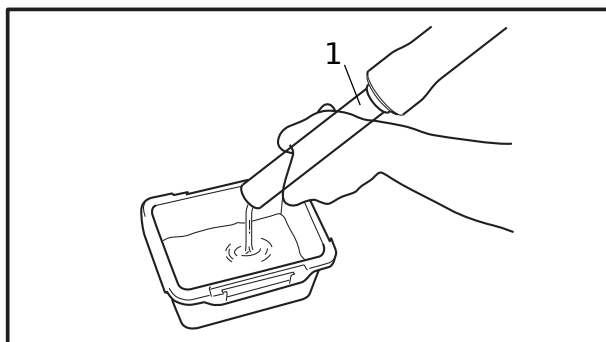
7. Remove:
 - 9front fork leg

EAS00655

DISASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Remove:
 - 9fork spring



2. Drain:
 - 9fork oil

NOTE:

Stroke the inner tube 1 several times while draining the fork oil.

3. Remove:
 - 9dust seal 1
 - 9oil seal clip 2
(with a flat-head screwdriver)

C

Do not scratch the inner tube.



4. Remove:
- 9 damper rod assembly bolt
 - 9 copper washer

NOTE:

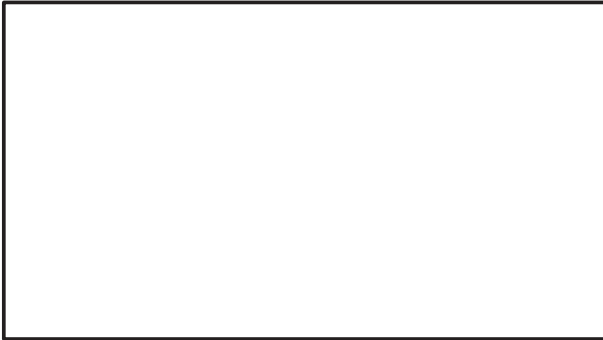
While holding the damper rod assembly with a 10 mm hexagon nut/socket wrench 1 and the T-handle 2, loosen the damper rod assembly bolt 3.

T-handle
90890-01326

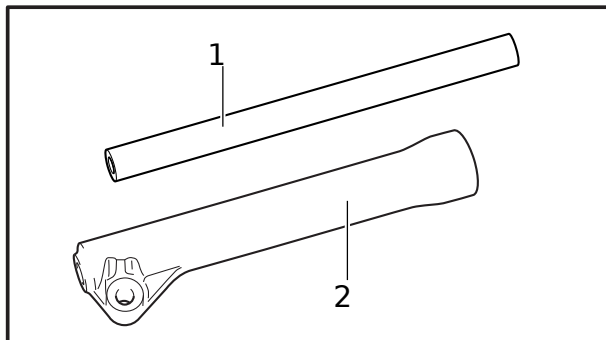
5. Remove:
- 9 inner tube
 - 9 rebound spring
 - 9 damper rod

NOTE:

Pull out the inner tube and damper rod together.



6. Remove:
- 9 oil seal 1
 - 2 Rag



EAS00657

CHECKING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Check:
 - 9inner tube 1
 - 9outer tube 2
 - Bends/damage/scratches → Replace.

W

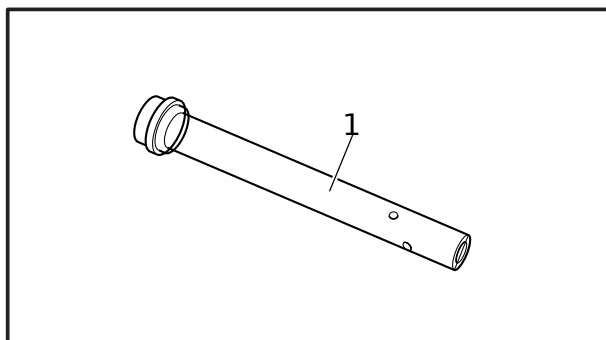
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.



2.Measure:

- 9spring free length a
- Out of specifications → Replace.

	Spring free length
	295.3 mm (11.63 in)
	<Limit>: 289.4 mm (11.39 in)



3. Check:

- 9damper rod 1
- Damage/wear → Replace.
- Obstructions → Blow out all of the oil passages with compressed air.

C

The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.

When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

EAS00659

ASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

W

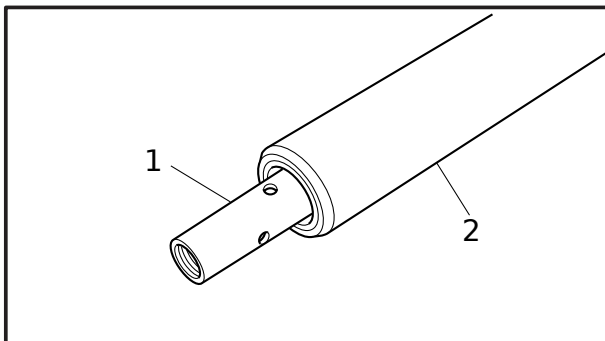
90 Make sure the oil levels in both front fork legs are equal.

90 Uneven oil levels can result in poor handling and a loss of stability.

NOTE:

90 When assembling the front fork leg, be sure to replace the oil seal.

90 Before assembling the front fork leg, make sure all of the components are clean.



1. Install:

- 90 damper rod 1
- 90 rebound spring
- 90 inner tube 2

C

Allow the damper rod to slide slowly down the inner tube 22 until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

2. Lubricate:

- 90 inner tube outer surface

Recommended lubricant
Fork oil 10W or equivalent

3. Tighten:

- 90 damper rod assembly bolt 1

23 Nm (2.3 m·kg, 17 ft·lb)
LOCTITE®

NOTE:

Tighten the damper rod assembly bolt 1 while holding the damper rod with the T-handle 2 and a 10 mm hexagon nut/socket wrench 3 .

T-handle**90890-01326**

4. Install:

9oil seal 1

(with the fork seal driver weight 2 and fork seal driver attachment 3)

Fork seal driver weight**90890-01184****Fork seal driver attachment****90890-01186**

cC

Make sure the numbered side of the oil seal faces up.

NOTE:

9Before installing the oil seal, lubricate its lips with lithium-soap-based grease.

9Lubricate the outer surface of the inner tube with fork oil.

9Before installing the oil seal, cover the top of the front fork leg with a plastic bag 4 to protect the oil seal during installation.

5. Install:

9oil seal clip 1

NOTE:

Adjust the oil seal clip so that it fits into the outer tube's groove.

6. Fill:

9front fork leg

(with the specified amount of the recommended fork oil)

Quantity (each front fork leg)
0.064 L (2.26 Imp.oz, 2.16 US oz)
Recommended oil
Fork oil 10W or equivalent

Front fork leg oil level aa (from the top of the inner tube, with the inner tube fully compressed and without the fork spring)
104.5 mm (4.11 in)

NOTE:

9While filling the front fork leg, keep it upright.

9After filling, slowly pump the front fork leg up and down to distribute the fork oil.

7. Install:

9fork spring 1

NOTE:

Install the fork spring with the smaller pitch facing up.

EAS00662

INSTALLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Install:

9front fork leg 1

9front fork cap bolt 2

Temporarily tighten the lower bracket pinch bolt.

NOTE:

Pull up the inner tube until it is stopped, then install the front fork cap bolt 2 .

2. Tighten:

9lower bracket pinch bolt 1

43 Nm (4.3 m.kg, 31 ft-lb)

9front fork cap bolt 2

50 Nm (5.0 m.kg, 36 ft-lb)

3. Install:

9front fender

10 Nm (1.0 m·kg, 7.2 ft·lb)

4. Install:

9front wheel

Refer to "FRONTWHEELAND BRAKE
DISC".

9brake hose clamp

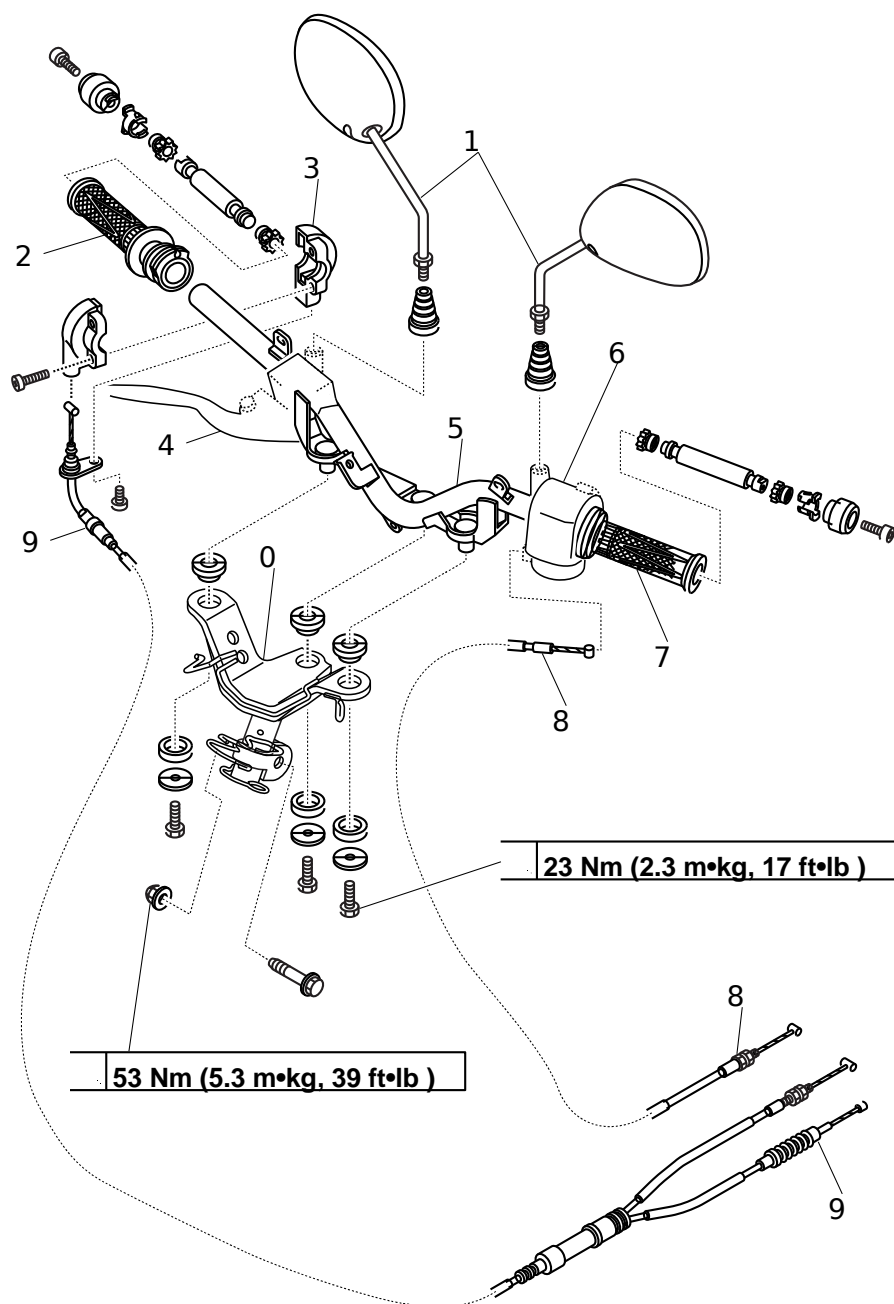
9brake caliper assembly

Refer to "FRONTBRAKE".

EASF0055

HANDLEBAR

- 1 Rear view mirror (left and right)
- 2 Throttle grip
- 3 Throttle housing
- 4 Master cylinder
- 5 Handlebar
- 6 Left handlebar switch
- 7 Handlebar grip
- 8 Starter cable
- 9 Throttle cable
- 0 Handlebar bracket



EAS00666

REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

W

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:

9side cowlings (left and right)

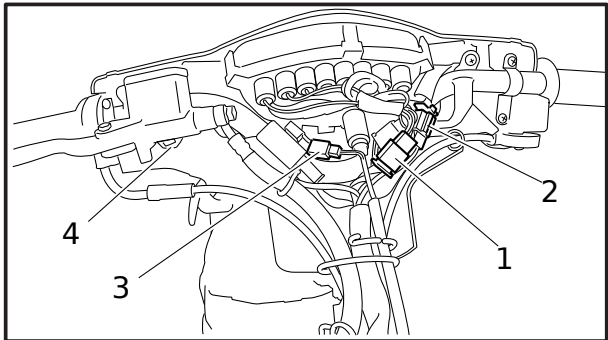
9front cowling

9center panels

Refer to "REMOVING THE FRONT COWLINGS" in chapter 3.

9headlight assembly

Refer to "REPLACING THE HEADLIGHT BULBS" in chapter 3.



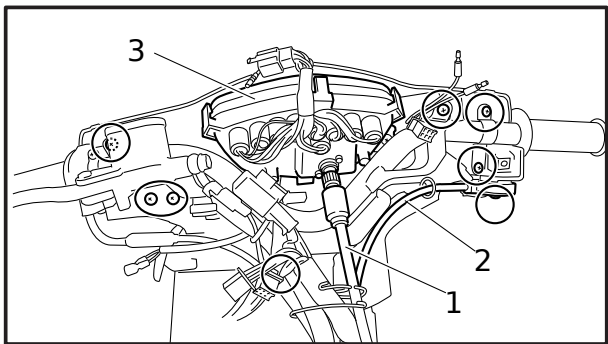
3. Disconnect:

9meter assembly couplers 1

9right handlebar switch coupler 2

9left handlebar switch coupler 3

9front brake light switch connectors 4



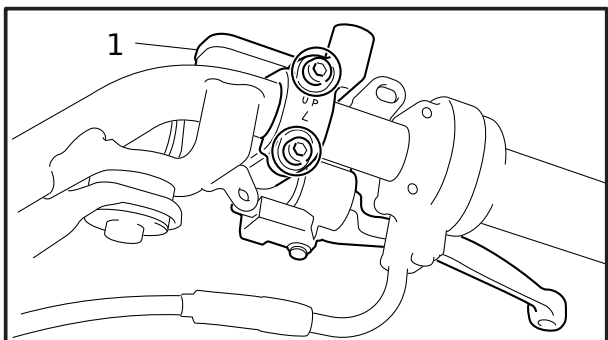
4. Disconnect:

9speedometer cable 1

9choke cable 2

5. Remove:

9speedometer assembly 3

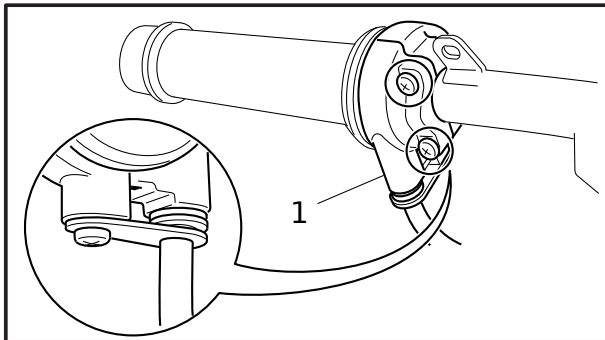


6. Remove:

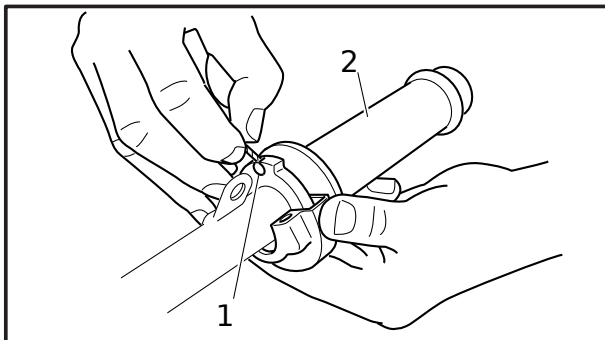
9rear view mirrors (left and right)

9brake master cylinder 1

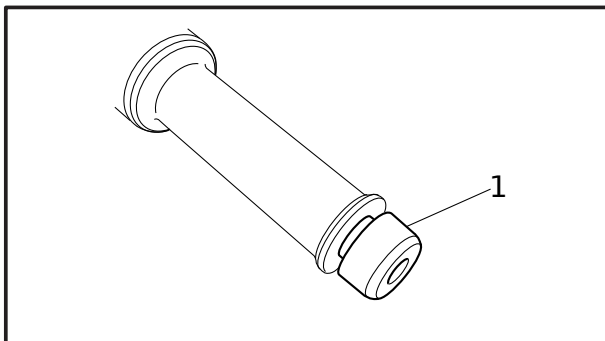
9throttle housing



7. Remove:
9lever holder 1



8. Remove:
9throttle cable 1
9throttle grip 2



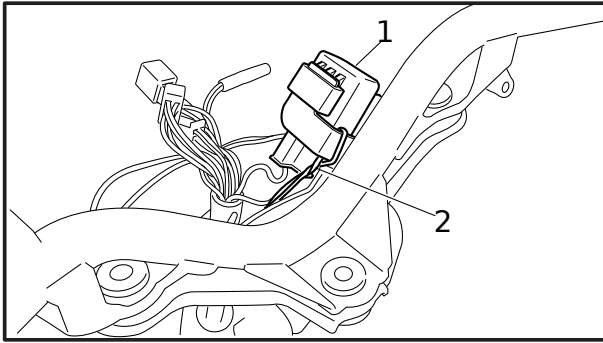
9. Remove:
9grip end 1



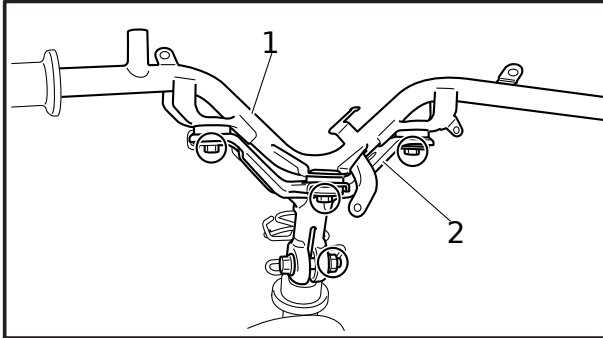
10. Remove:
9handlebar grip 1

NOTE:

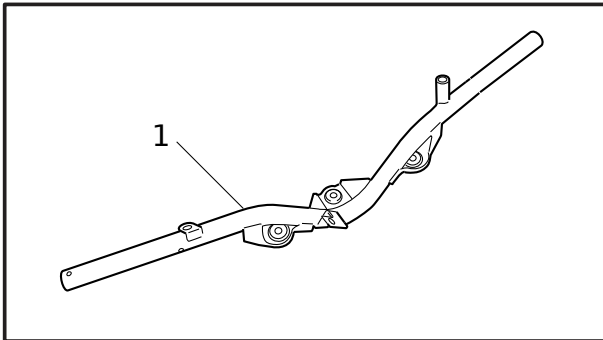
Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.



11. Remove:
- 9relay
 - 9wire harness strap 1



12. Remove:
- 9handlebar 1
 - 9washers
 - 9bushings
 - 9handlebar bracket 2



EAS00668

CHECKING THE HANDLEBAR

1. Check:
- 9handlebar 1
 - Bends/cracks/damage → Replace.

W _____

Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

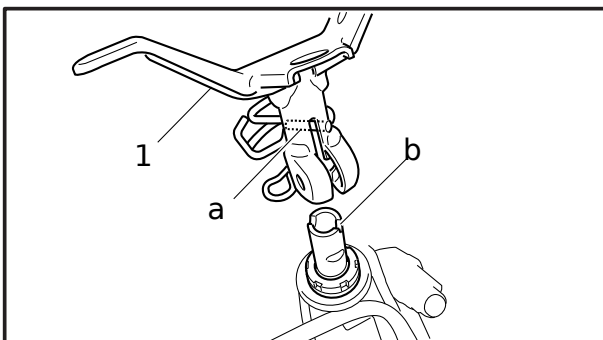
EAS00670

INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

W _____

Securely support the vehicle so that there is no danger of it falling over.



2. Install:
- 9handlebar bracket 1

53 Nm (5.3 m.kg, 38 ft.lb)

NOTE:

Align the projection **a** in the handlebar bracket with the slit **b** in the steering shaft.

3. Install:

9bushings

9washers

9handlebar

23 Nm (2.3 m·kg, 17 ft·lb)

9wire harness strap

Refer to "CABLE ROUTING" in chapter 2.

4. Install:

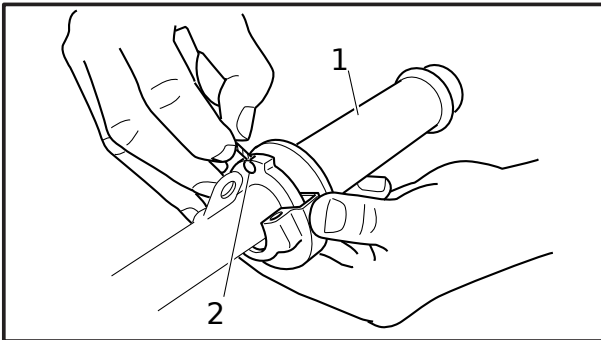
9handlebar grip

★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

- Apply a thin coat of rubber adhesive onto the left end of the handlebar.
- Slide the handlebar grip over the left end of the handlebar.
- Wipe off any excess rubber adhesive with a clean rag.

W

Do not touch the handlebar grip until the rubber adhesive has fully dried.



★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

5. Install:

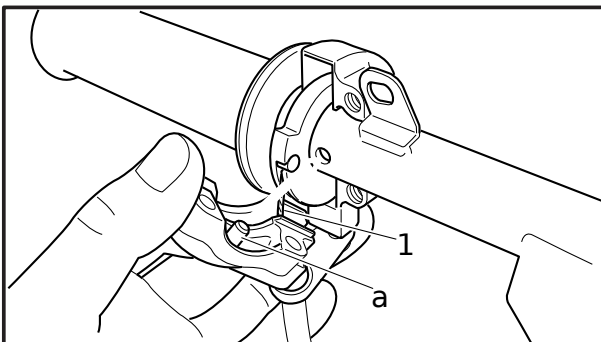
9throttle grip 1

9throttle cable 2

9throttle housing

NOTE:

Lubricate the inside of the throttle grip with a thin coat of lithium-soap-based grease and install it onto the handlebar.



6. Install:

9lever holder 1

NOTE:

Align the projection a on the right handlebar switch with the hole in the handlebar.

W

Make sure the throttle grip operates smoothly.

7. Install:

9brake master cylinder

	11 Nm (1.1 m·kg, 8.0 ft·lb)
--	------------------------------------

Refer to "FRONTBRAKE".

8. Install:

9plastic locking ties

Refer to "CABLE ROUTING" in chapter 2.

9. Adjust:

9throttle cable free play

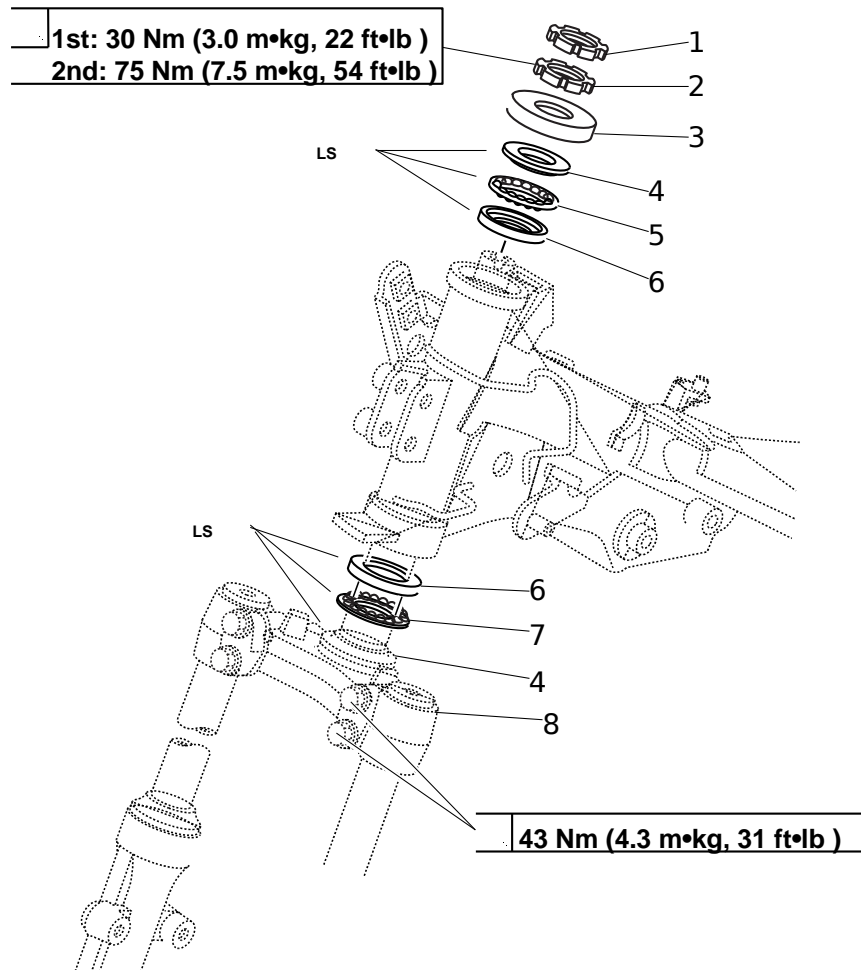
Refer to "ADJUSTING THE THROTTLE
CABLE FREE PLAY" in chapter 3.

	Throttle cable free play (at the flange of the throttle grip)
	3–7 mm (0.12–0.28 in)

EASF0057

STEERING HEAD

- 1 Upper ring nut
- 2 Lower ring nut
- 3 Ball race cover
- 4 Bearing inner race
- 5 Upper bearing
- 6 Bearing outer race
- 7 Lower bearing
- 8 Lower bracket



EAS00679

REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

W

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:

- 9side cowlings (left and right)

- 9center panels

- 9inner panel

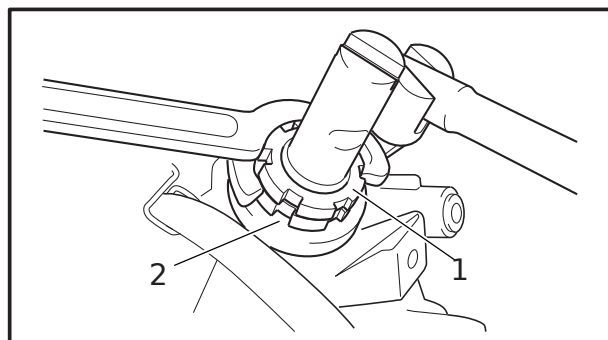
Refer to "REMOVING THE FRONT COWLINGS" in chapter 3.

- 9front fork

Refer to "FRONT FORK".

- 9handlebar

Refer to "HANDLEBAR".



3. Remove:

- 9upper ring nut 1

- 9lower ring nut 2

NOTE:

Hold the lower ring nut with the steering nut wrench, and then remove the upper ring nut with the ring nut wrench.

Steering nut wrench**90890-01403****Ring nut wrench****90890-01268****W**

Securely support the lower bracket so that there is no danger of it falling.

EAS00681

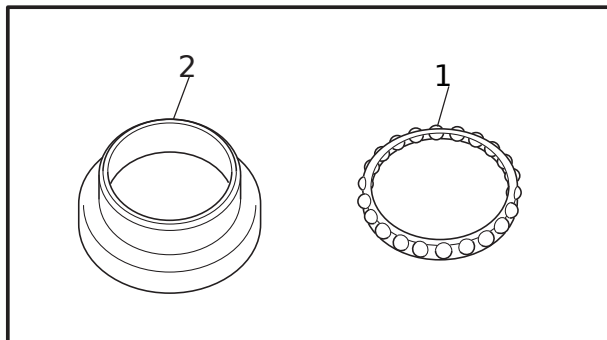
CHECKING THE STEERING HEAD

1. Wash:

- 9bearings

- 9bearing races

Recommended cleaning solvent**Kerosene**



2. Check:

9bearings 1

9bearing races 2

Damage/pitting → Replace.



3. Replace:

9bearings

9bearing races

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- Remove the bearing races from the steering head pipe with a long rod 1 and hammer.
- Remove the bearing race from the lower bracket with a floor chisel 2 and hammer.
- Install a new rubber seal and new bearing races.

cC

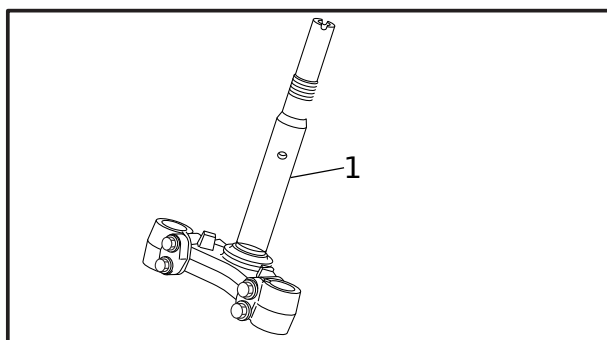
If the bearing race is not installed properly, the steering head pipe could be damaged.

NOTE:

9Always replace the bearings and bearing races as a set.

9Whenever the steering head is disassembled, replace the rubber seal.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆



4. Check:

9lower bracket 1

(along with the steering stem)

Bends/cracks/damage → Replace.

EAS00683

INSTALLING THE STEERING HEAD

1. Lubricate:

- 9upper bearing
- 9lower bearing
- 9bearing races

	Recommended lubricant Lithium-soap-based grease
--	--

2. Install:

- 9lower ring nut
- 9upper ring nut

Refer to "CHECKING AND ADJUSTING
THE STEERING HEAD" in chapter 3.

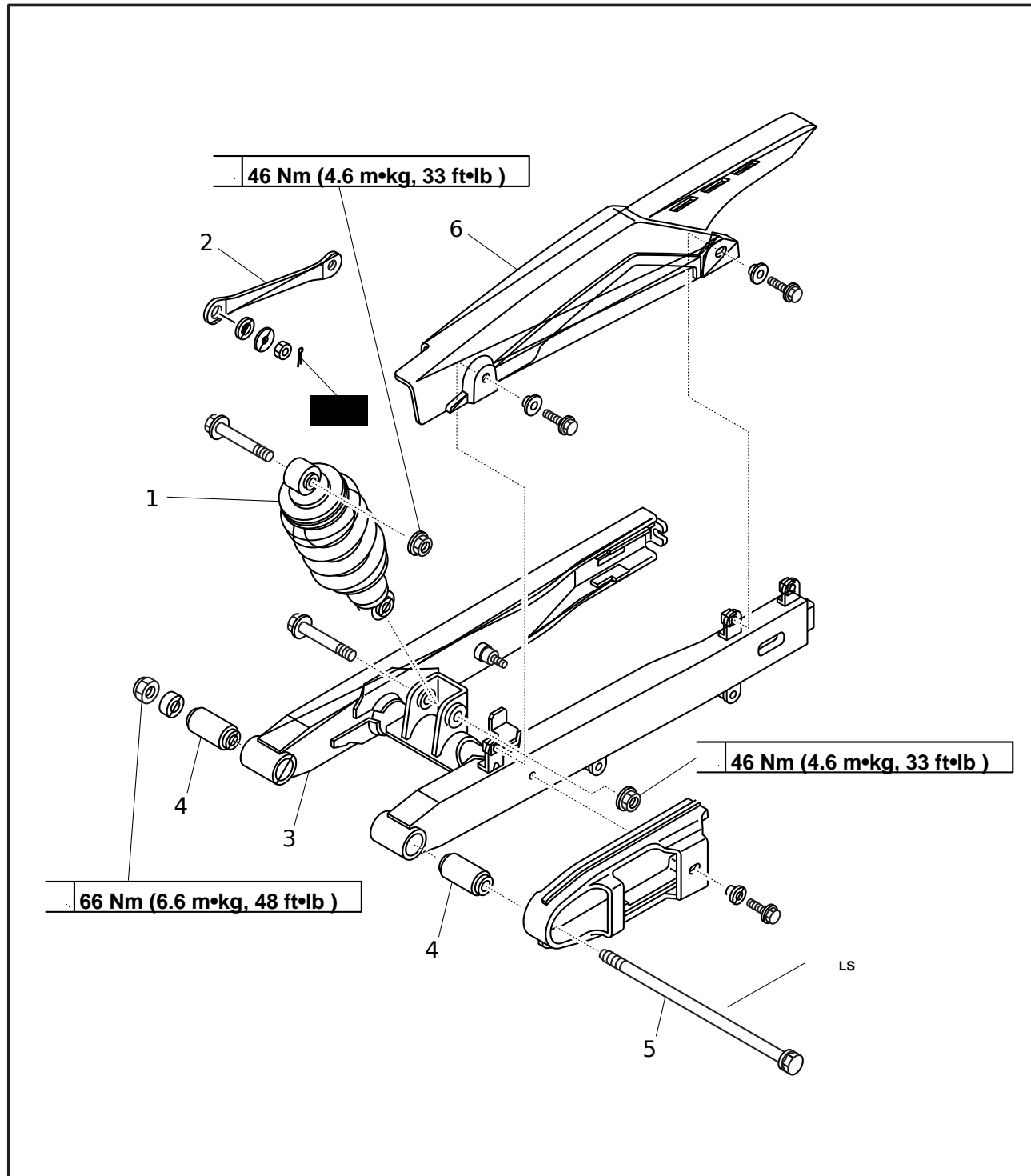
3. Install:

- 9front fork legs

Refer to "FRONTFORK".

REAR SHOCK ABSORBER ASSEMBLY AND SWINGARM

- 1 Rear shock absorber
- 2 Brake torque rod
- 3 Swingarm
- 4 Bushing
- 5 Swingarm pivot shaft
- 6 Drive chain case



EAS00691/EAS00702

REMOVING THE REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

1. Stand the vehicle on a level surface.

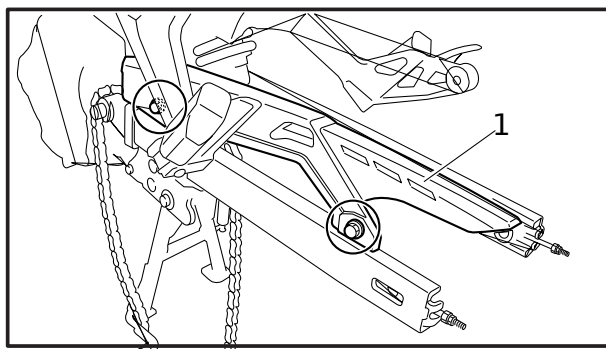
W

Securely support the vehicle so that there is no danger of it falling over.

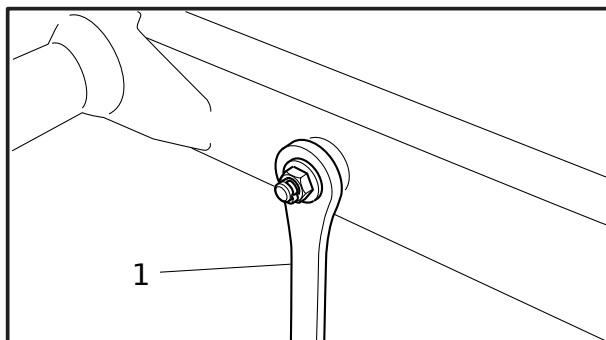
NOTE:

Place the vehicle on a suitable stand so that the rear wheel is elevated.

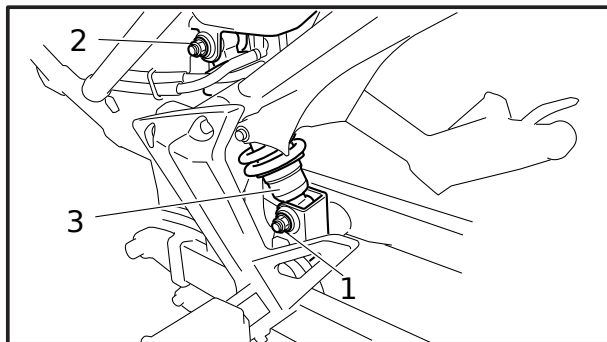
2. Remove:
 - 9center panel
 - 9rear cowlings (left and right)
Refer to "REMOVING THE REAR COWLINGS" in chapter 3.
 - 9muffler
Refer to "REMOVING THE ENGINE" in chapter 4.
 - 9rear wheel
Refer to "REAR WHEEL AND BRAKE".



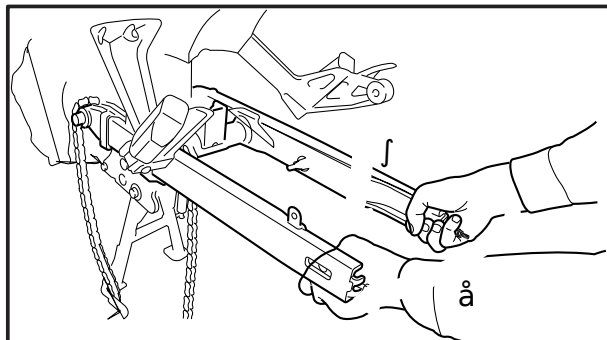
3. Remove:
 - 9drive chain case bolts
 - 9drive chain case 1



4. Remove:
 - 9cotter pin
 - 9washer
 - 9brake torque rod 1



5. Remove:
 - 9 rear shock absorber bolt (upper and lower)
 - 1
 - 9 washer
 - 9 rear shock absorber nut (upper and lower)
 - 2
 - 9 washers
 - 9 rear shock absorber assembly 3



6. Measure:
 - 9 swingarm side play
 - 9 swingarm vertical movement
- ★★
- a. Measure the tightening torque of the swingarm pivot shaft nut.

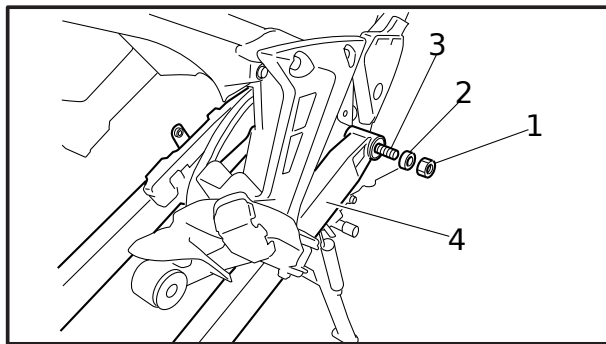
	Pivot shaft nut
	66 Nm (6.6 m·kg, 43 ft·lb)

- b. Measure the swingarm side play \hat{a} by moving the swingarm from side to side.
- c. If the swingarm side play is out of specification, check the spacers and bearings.

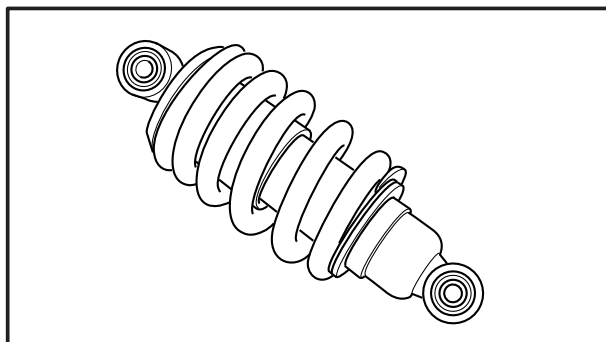
	Swingarm side play (at the end of the swingarm)
	1 mm (0.04 in)

- d. Check the swingarm vertical movement \int by moving the swingarm up and down. If swingarm vertical movement is not smooth or if there is binding, check the washer and bushings.

★★



7. Remove:
 - 9swingarm pivot shaft nut 1
 - 9washer 2
 - 9swingarm pivot shaft 3
 - 9swingarm 4

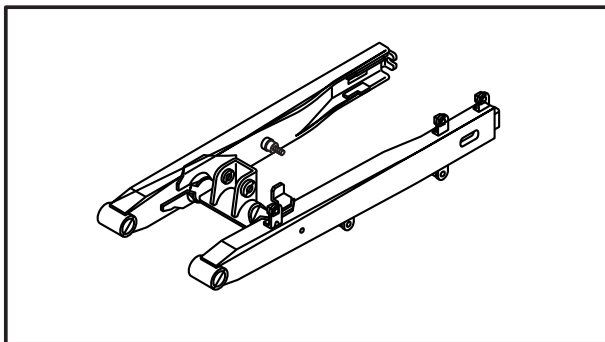


EAS00695

CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES

The following procedure applies to both rear shock absorber assemblies.

1. Check:
 - 9rear shock absorber rod
 - Bends/damage → Replace the rear shock absorber assembly.
 - 9rear shock absorber
 - Oil leaks → Replace the rear shock absorber assembly.
 - 9spring
 - Damage/wear → Replace the rear shock absorber assembly.
 - 9bushings
 - Damage/wear → Replace.
 - 9bolts
 - Bends/damage/wear → Replace.



EAS00707

CHECKING THE SWINGARM

1. Check:
 - 9swingarm
 - Bends/cracks/damage → Replace.
2. Check:
 - 9swingarm pivot shaft
 - Roll the pivot shaft on a flat surface.
 - Bends → Replace.

W

Do not attempt to straighten a bent pivot shaft.

3. Wash:
 - 9swingarm pivot shaft
 - 9washer
 - 9bushings

	Recommended cleaning solvent Kerosene
--	--

4. Check:
 - 9washer
 - Damage/wear → Replace.
 - 9bushings
 - Damage/wear → Replace.

EAS00711/EAS00699

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

1. Lubricate:
 - 9swingarm pivot shaft

	Recommended lubricant Lithium-soap-based grease
--	--

2. Install:

- 9swingarm
- 9swingarm pivot shaft
- 9collar
- 9swingarm pivot shaft nut

66 Nm (6.6 m·kg, 48 ft·lb)

3. Install:

- 9rear shock absorber assemblies
- 9rear shock absorber nuts
- 9rear shock absorber bolts

46 Nm (4.6 m·kg, 33 ft·lb)

4. Install:

- 9brake torque rod (to swingarm)

16 Nm (1.6 m·kg, 12 ft·lb)

5. Install:

- 9drive chain case

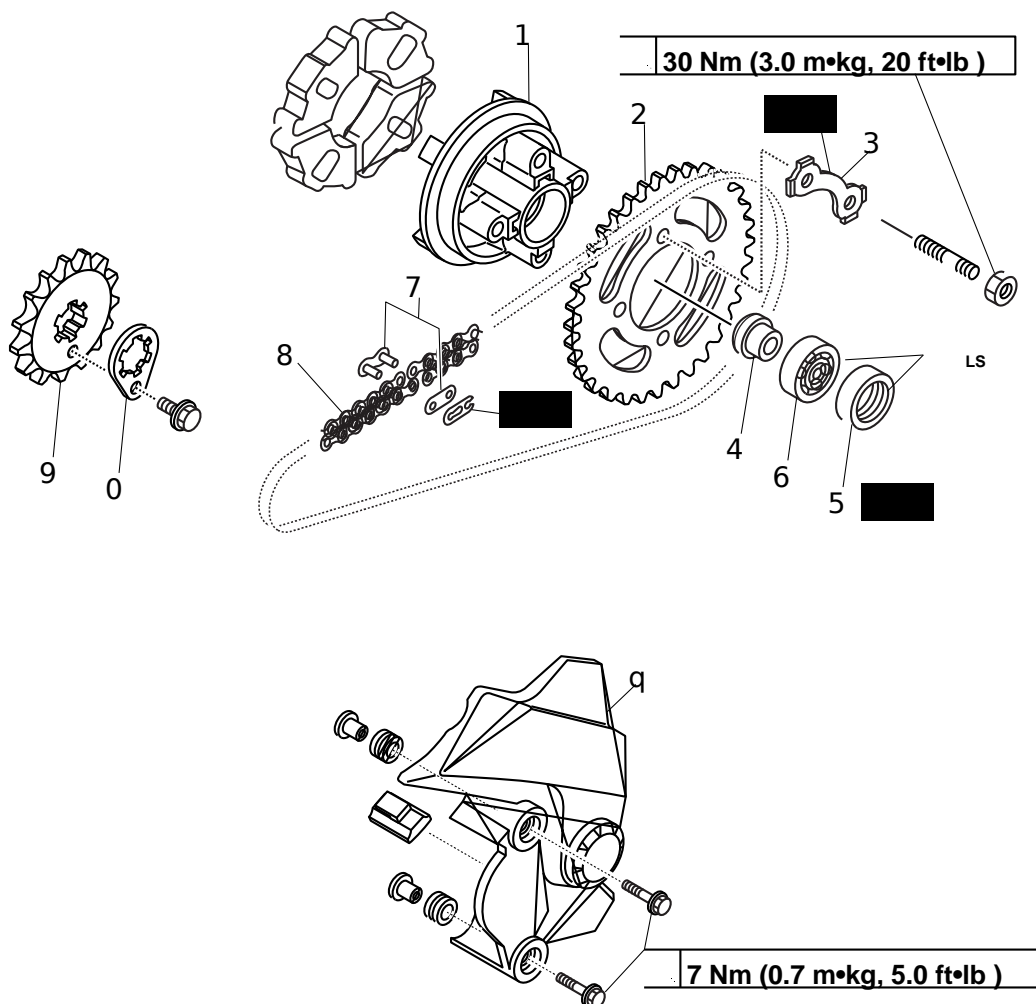
10 Nm (1.0 m·kg, 7.2 ft·lb)

6. Install:

- 9rear wheel
 - Refer to "REAR WHEEL AND BRAKE".
- 9muffler
 - Refer to "REMOVING THE ENGINE" in chapter 4.
- 9rear cowlings (left and right)
 - Refer to "INSTALLING THE REAR COWLINGS" in chapter 3.

DRIVE CHAIN AND SPROCKETS

- | | | | |
|---|----------------------|---|----------------------|
| 1 | Rear wheel drive hub | 0 | Circlip |
| 2 | Driven sprocket | q | Drive sprocket cover |
| 3 | Lock washer | | |
| 4 | Collar | | |
| 5 | Oil seal | | |
| 6 | Bearing | | |
| 7 | Master link | | |
| 8 | Drive chain | | |
| 9 | Drive sprocket | | |



EAS00706

REMOVING THE DRIVE CHAIN AND SPROCKETS

1. Stand the vehicle on a level surface.

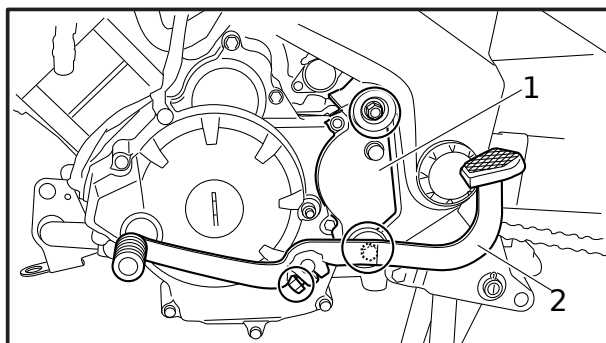
W

Securely support the vehicle so that there is no danger of it falling over.

NOTE:

Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:
 - 9rear wheel
 - 9rear wheel drive hub assembly
 - Refer to "REAR WHEEL AND BRAKE".

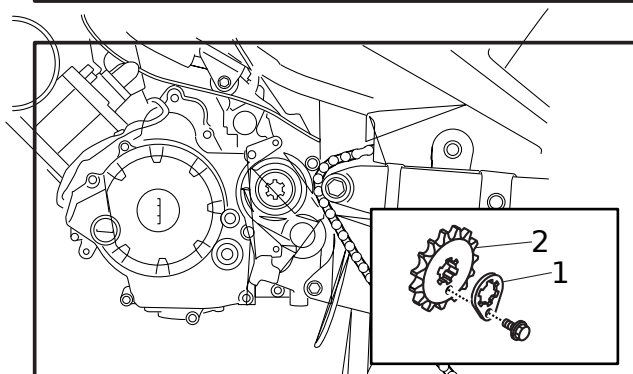


3. Remove:
 - 9shift pedal bolt
 - 9shift pedal 1
 - 9drive sprocket cover bolts
 - 9drive sprocket cover 2

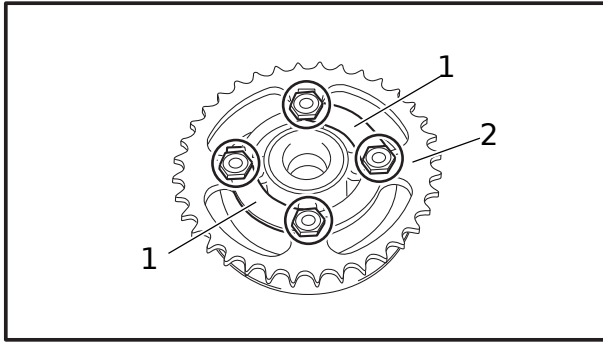


4. Remove:
 - 9master link clip 1
 - 9master link plate 2
 - 9master link body 3

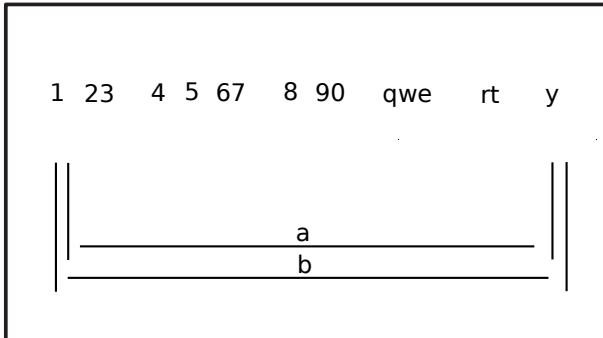
5. Remove:
 - 9drive chain



6. Remove:
 - 9sprocket holder bolt
 - 9drive sprocket holder 1
 - 9drive sprocket 2



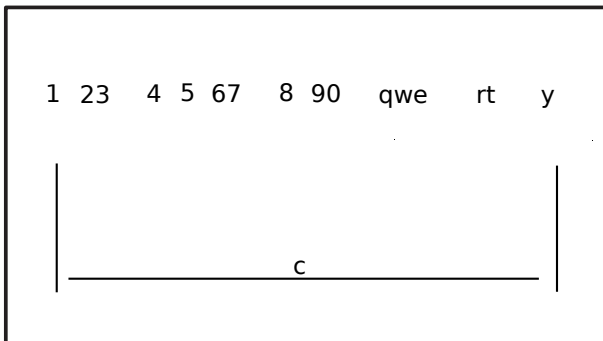
7. Straighten the lock washer tabs.
8. Remove:
 - 9driven sprocket nuts
 - 9driven sprocket bolts
 - 9lock washers 1
 - 9driven sprocket 2



EAS00710

CHECKING THE DRIVE CHAIN

1. Measure:
 - 9Measure the length of 15 links on the inner side a and outer side b of the pin and calculate the length between pin centers.
 - 9Length c between pin centers = (inner dimension a + outer dimension b)/2
 - 915-Link section c of the drive chain
 - Out of specification → Replace the drive chain, drive sprocket and rear wheel sprocket as a set.



	15-link drive chain section limit (maximum)
	194.3 mm (7.65 in)

NOTE:

- 9While measuring the 15-link section, push down on the drive chain to increase its tension.
- 9Perform this measurement at two or three different places.

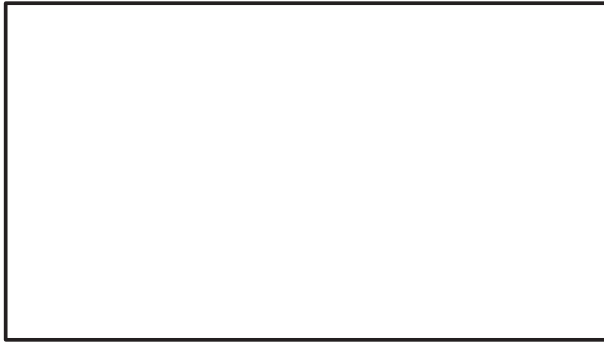


2. Check:
 - 9drive chain
 - Stiffness → Clean and lubricate or replace.



3. Clean:
 - 9drive chain
 - ★★
 - a. Wipe the drive chain with a clean cloth.
 - b. Put the drive chain in kerosene and remove any remaining dirt.
 - c. Remove the drive chain from the kerosene and completely dry it.

★★



4. Check:

9drive chain rollers 1

Damage/wear → Replace the drive chain.

9drive chain side plates 2

Cracks/damage/wear → Replace the drive chain.

5. Lubricate:

9drive chain

Recommended lubricant

Engine oil or chain lubricant

suitable for non-O-ring chains



6. Check:

9drive sprocket

9driven sprocket

Worn more than 1/4 tooth a → Replace the drive chain and sprockets as a set.

Bent teeth → Replace the drive chain and sprockets as a set.

b Correct

1 Drive chain roller

2 Drive chain sprocket

EAS00714

INSTALLING THE DRIVE CHAIN AND SPROCKETS

1. Install:

9driven sprocket 2

30 Nm (3.0 m·kg, 22 ft·lb)

9lock washers 1

9driven sprocket bolts

9driven sprocket nuts

NOTE:

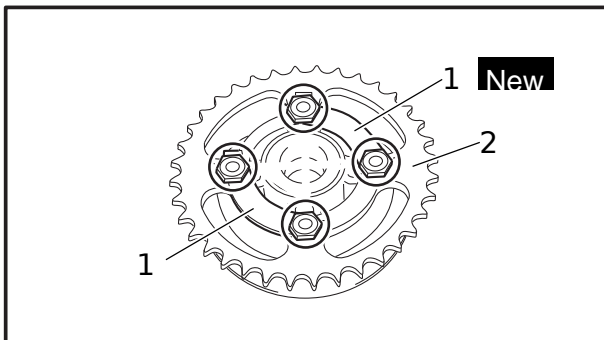
Tighten the bolts in a crisscross pattern.

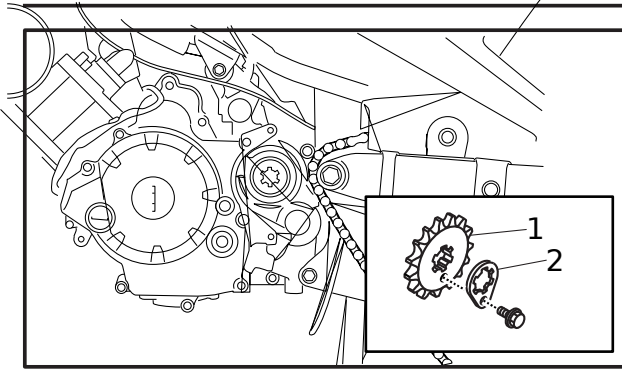
2. Bend:

9lock washer tab 1

NOTE:

Bend the lock washer tabs along a flat side of each bolt.





3. Install:
 - 9drive sprocket 1
 - 9sprocket holder 2
 - 9Sprocket holder bolt

4. Lubricate:
 - 9drive chain
 - 9master link

<p>Recommended lubricant Engine oil or chain lubricant suitable for non-O-ring chains</p>
--

5. Install:
 - 9master link body
 - 9master link plate
6. Install:
 - 9master link clip 1

C

The closed end of the master link clip must face in the direction of drive chain rotation.
Never install a new drive chain onto worn drive chain sprockets; this will dramatically shorten the drive chains life.

7. Adjust:
 - 9drive chain slack

Refer to “ADJUSTING THE DRIVE CHAIN SLACK” in chapter 3.

<p>Drive chain slack 25–35 mm (0.98–1.38 in)</p>

C

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.



CHAPTER 8 ELECTRICAL SYSTEM

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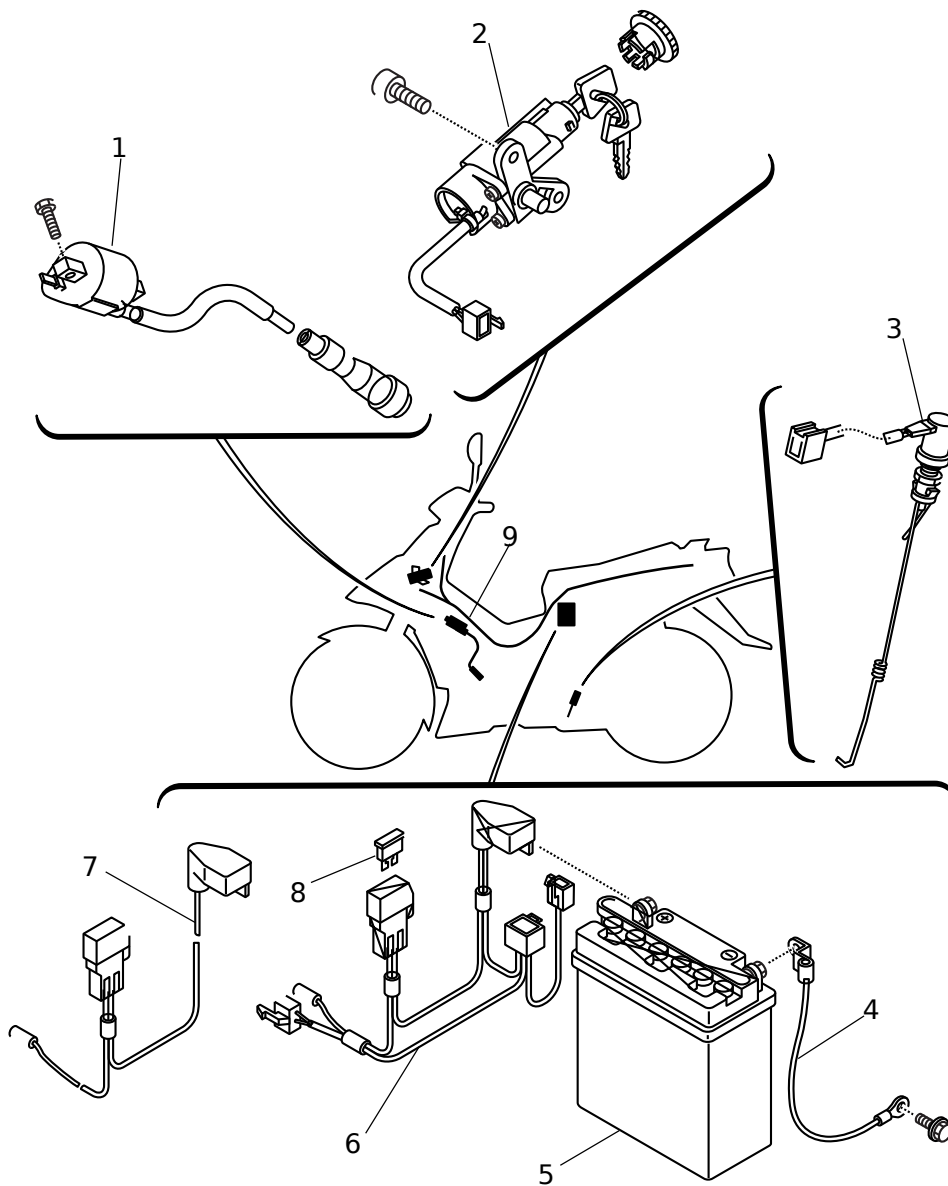


EAS00729

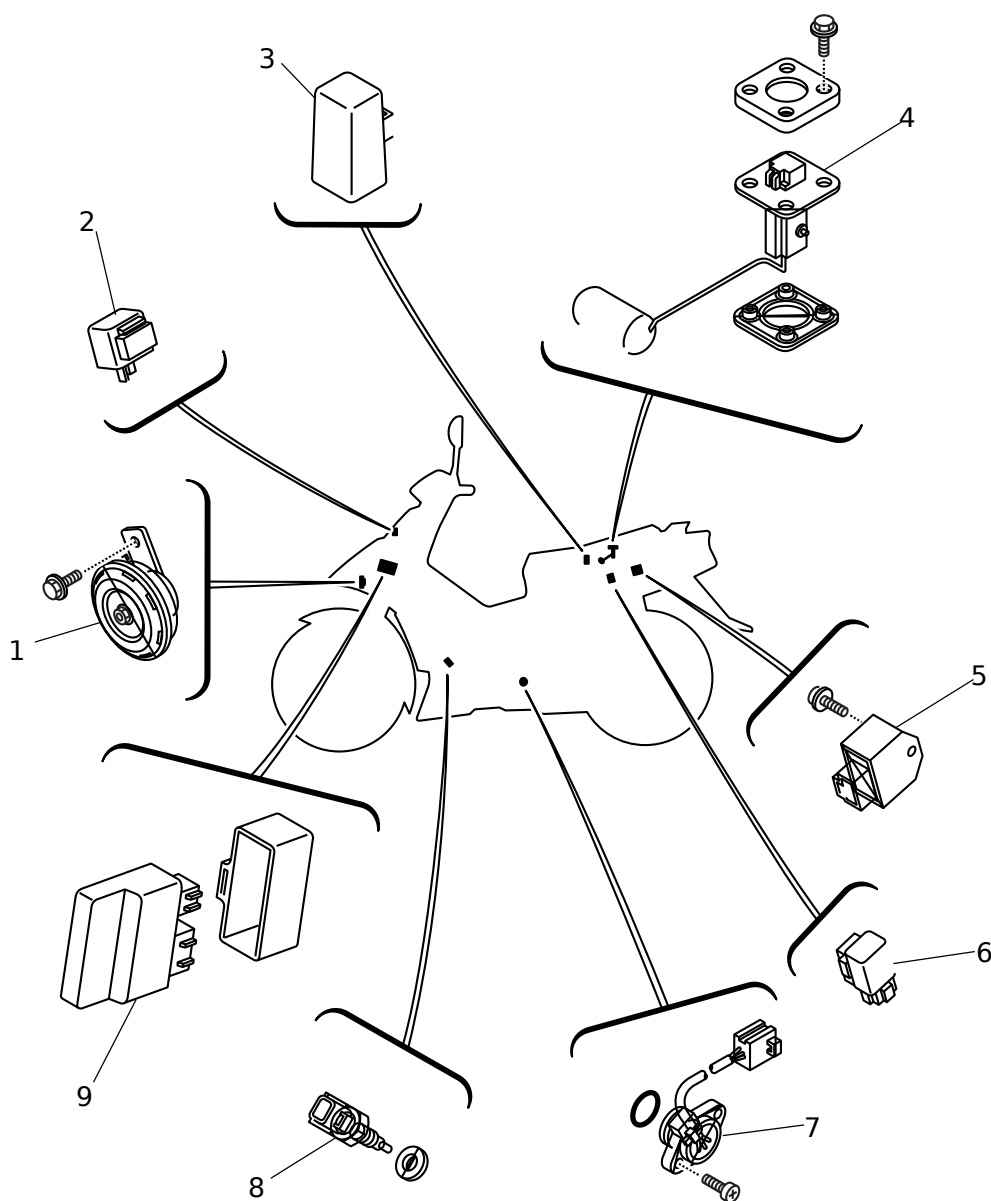
ELECTRICALSYSTEM

ELECTRICALCOMPONENTS

- | | |
|----------------------------------|---------------------------------|
| 1 Ignition coil | 7 Positive battery lead (T135S) |
| 2 Main switch | 8 Fuse |
| 3 Rear brake light switch | 9 Wire harness |
| 4 Negative battery lead | |
| 5 Battery | |
| 6 Positive battery lead (T135SE) | |



- | | |
|--------------------------|-----------------|
| 1 Horn | 8 Thermo sensor |
| 2 Turn signal relay | 9 C.D.I. unit |
| 3 Starter relay (T135SE) | |
| 4 Fuel gauge | |
| 5 Rectifier/regulator | |
| 6 Fan motor relay | |
| 7 Neutral switch | |



EAS00730

CHECKING SWITCH CONTINUITY

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

C

Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.

	Pocket tester 90890-03112
--	------------------------------

NOTE:

- Before checking for continuity, set the pocket tester to “0” and to the “Ω 1” range.
- When checking for continuity, switch back and forth between the switch positions a few times.

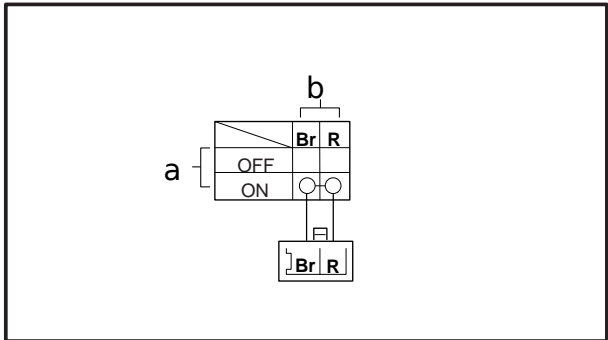
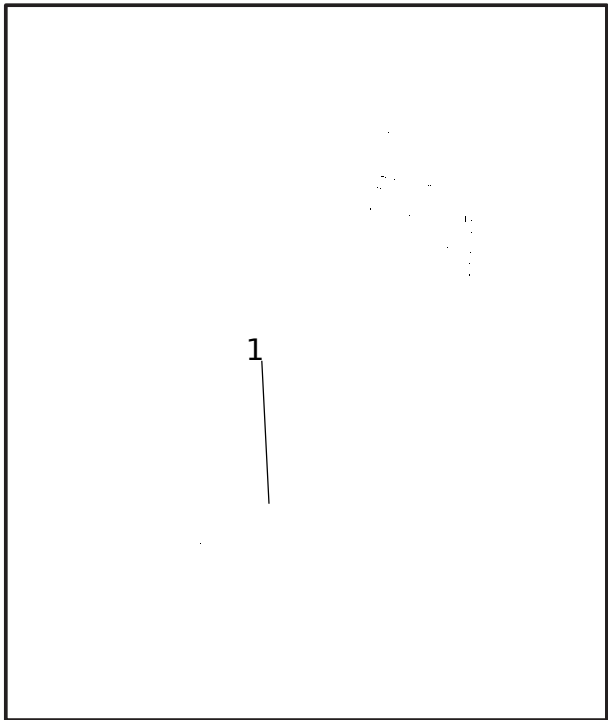
The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left. The switch positions a are shown in the far left column and the switch lead colors b are shown in the top row in the switch illustration.

NOTE:

“1 —1 ” indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration on the left shows that:

There is continuity between red and brown when the switch is set to “ON”.



ELEC	-
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EAS00731

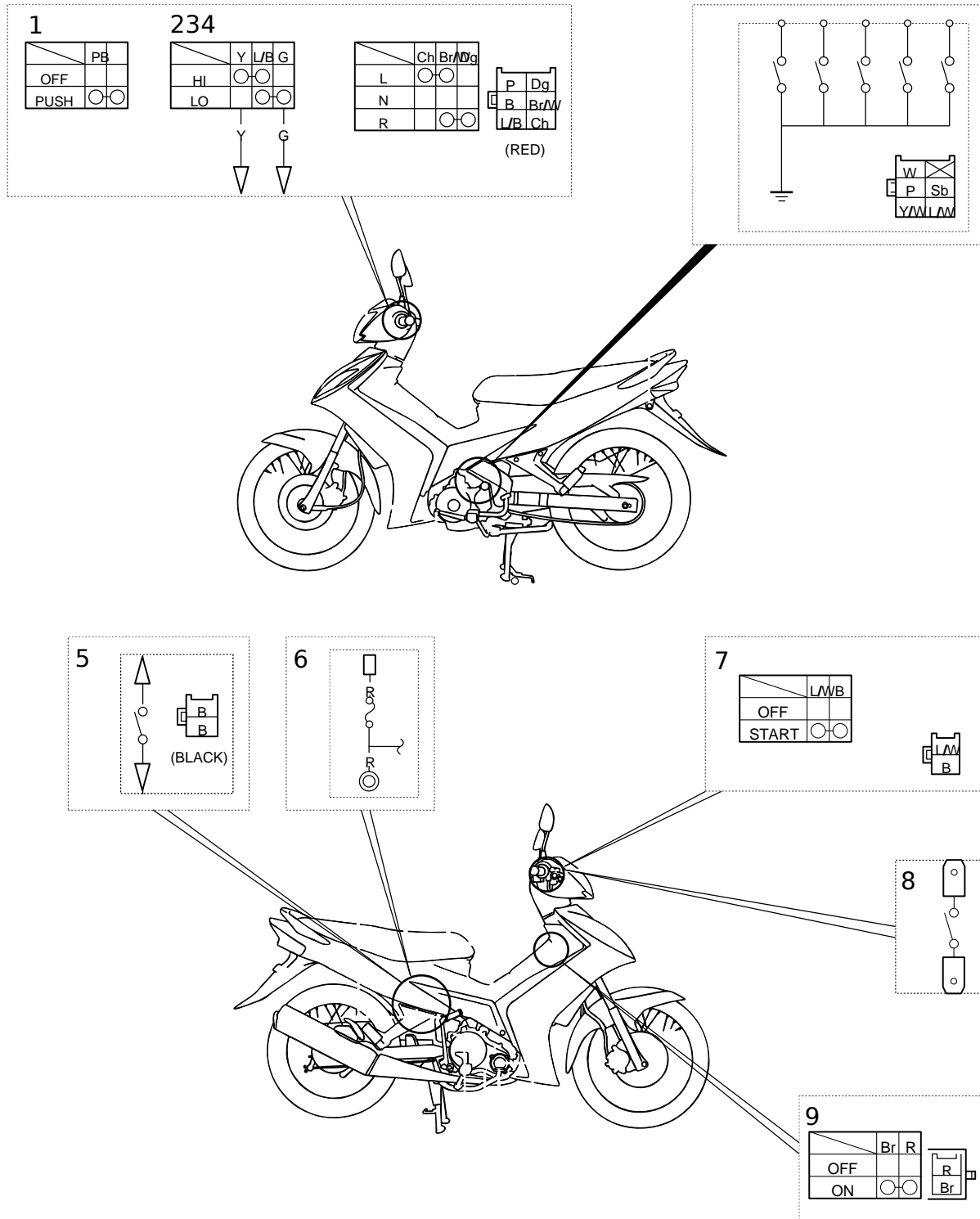
CHECKING THE SWITCHES

Check each switch for damage or wear, proper connections, and also for continuity between the terminals. Refer to "CHECKING SWITCH CONTINUITY".

Damage/wear → Repair or replace.

Improperly connected → Properly connect.

Incorrect continuity reading → Replace the switch.



CHECKING THE SWITCHES

ELEC	-
------	---

- 1 Horn switch
- 2 Dimmer switch
- 3 Turn signal switch
- 4 Neutral switch
- 5 Rear brake light switch
- 6 Fuse
- 7 Start switch
- 8 Front brake light switch
- 9 Main switch

EAS00732

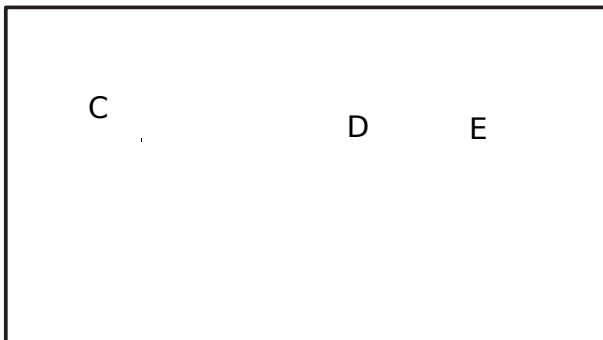
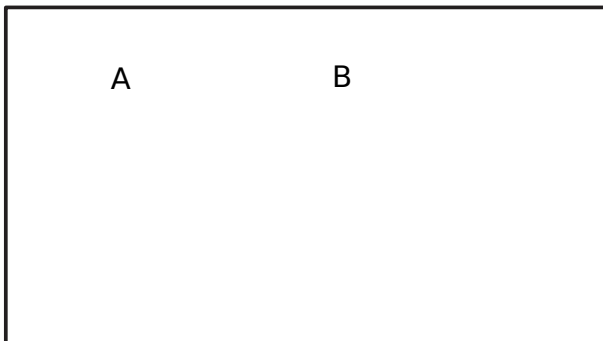
CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.

Improperly connected → Properly connect.

No continuity → Repair or replace the bulb, bulb socket or both.



TYPES OF BULBS

The bulbs used on this vehicle are shown in the illustration on the left.

9Bulbs A and B are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.

9Bulb C is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.

9Bulbs D and E are used for meter and indicator lights and can be removed from their respective sockets by carefully pulling them out.

CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

1. Remove:

9bulb

W

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

cC

9Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.

9A Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

2. Check:

9bulb (for continuity)

(with the pocket tester)

No continuity → Replace.

Pocket tester

90890-03112

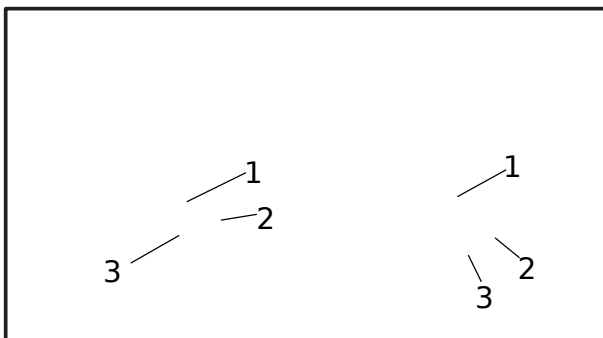
NOTE:

Before checking for continuity, set the pocket tester to "0" and to the " Ω 1" range.

★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

- Connect the positive tester probe to terminal 1 and the negative tester probe to terminal 2, and check for continuity.
- Connect the positive tester probe to terminal 1 and the negative tester probe to terminal 3, and check for continuity.
- If either of the readings indicate no continuity, replace the bulb.

★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★



CHECKING THE CONDITION OF THE BULB SOCKETS

The following procedure applies to all of the bulb sockets.

1. Check:
 - 9bulb socket (for continuity)
(with the pocket tester)
No continuity → Replace.

	Pocket tester 90890-03112
--	--

NOTE:

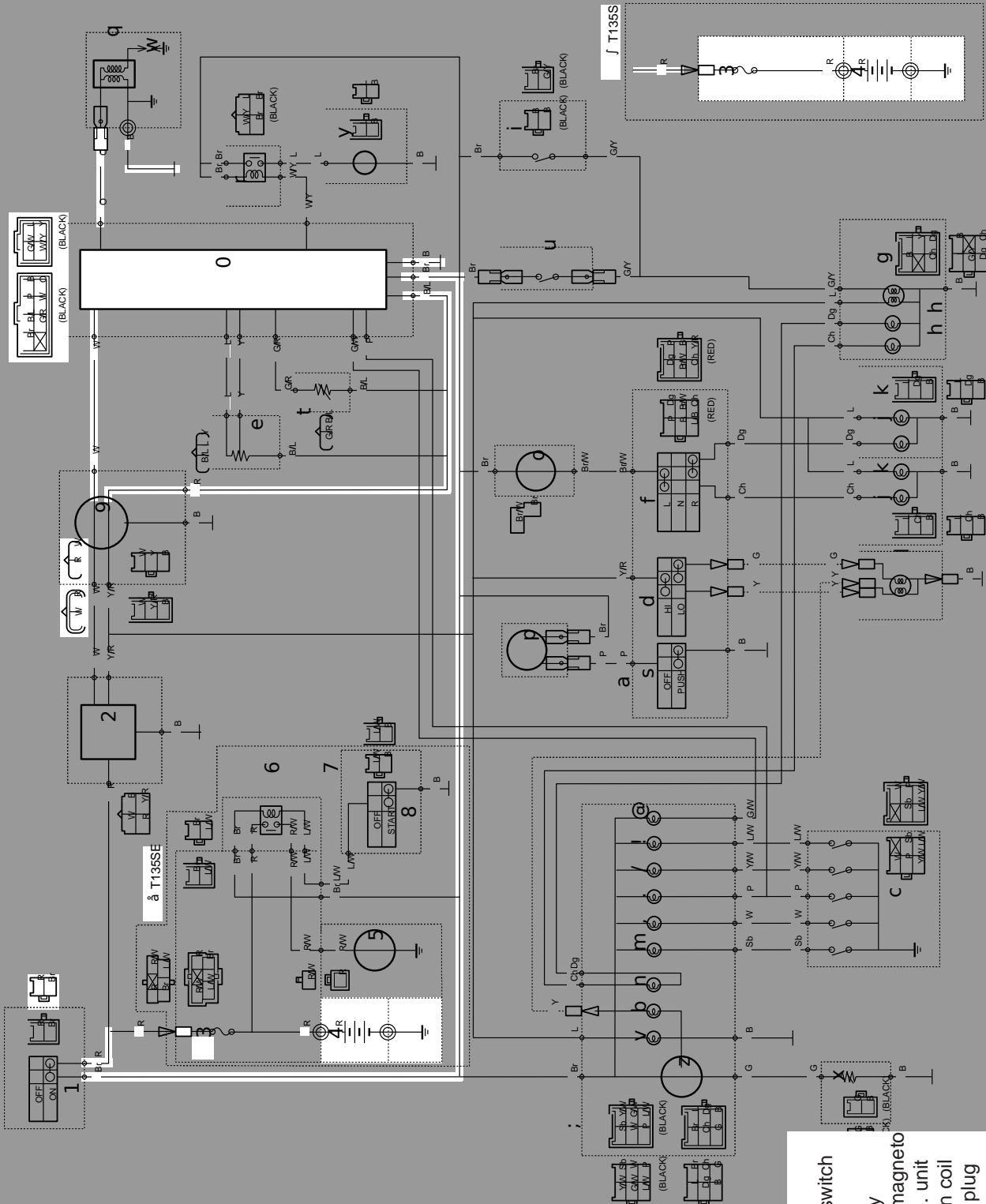
Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

CIRCUIT DIAGRAM



- 1 Main switch
- 3 Fuse
- 4 Battery
- 9 A. C. magneto
- 0 C. D. I. unit
- q Ignition coil
- w Spark plug

EAS00736

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

Check:

1. fuse
2. battery
3. spark plug
4. ignition spark gap
5. spark plug cap resistance
6. ignition coil resistance
7. pickup coil resistance
8. main switch
9. wiring connections (of the entire ignition system)

NOTE:

Before troubleshooting, remove the following part(s):

1. side cowlings (left and right)
2. front cowlings
3. center panels (upper and lower)
4. rear cowlings (left and right)
5. inner panel

Troubleshoot with the following special tool(s).

<input type="checkbox"/>	Ignition checker 90890-06754
<input type="checkbox"/>	Pocket tester 90890-03112

EAS00738

1. Fuse
<p>Check the fuse for continuity. Refer to "CHECKING THE FUSE" in chapter 3.</p> <p>Is the fuse OK?</p>

↓ YES

NO

Replace the fuse.

EAS00739

2. Battery

Check the condition of the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage
12.8 V or more at 20° C

Is the battery OK?



YES

NO

Clean the battery terminals.
Recharge or replace the battery.

EAS00740

3. Spark plug

Check the condition of the spark plug.
Check the spark plug type.
Measure the spark plug gap.
Refer to "CHECKING THE SPARK PLUG" in chapter 3.



Standard spark plug
CPR8EA-9 (NGK)
Spark plug gap
0.8–0.9 mm (0.031–0.035 in)

Is the spark plug in good condition, is it of the correct type, and is its gap within specification?



YES

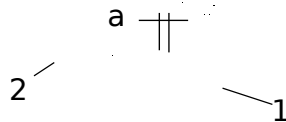
NO

Re-gap or replace the spark plug.

EAS00742

4. Ignition spark gap

- 9 Disconnect the spark plug cap from the spark plug.
- 9 Connect the ignition checker 1 as shown.
- 2 Spark plug cap
- 9 Set the main switch to "ON".
- 9 Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.
- 9 Measure the ignition spark gap a .



**Minimum ignition spark gap
6 mm (0.24 in)**

9 Is there a spark and is the spark gap within specification?

NO



YES

The ignition system
is OK.

EAS00744

5. Spark plug cap resistance

- 9 Remove the spark plug cap from the spark plug lead.
- 9 Connect the pocket tester ("Ω· 1k" range) to the spark plug cap as shown.
- 9 Measure the spark plug cap resistance.



**Spark plug cap resistance
5 kΩ at 20° C (68° F)**

9 Is the spark plug cap OK?



YES

NO

Replace the spark
plug cap.

EAS00746

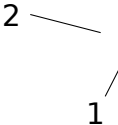
6. Ignition coil resistance

9Disconnect the ignition coil connector from the ignition coil terminal.

9Connect the pocket tester (Ω 1) to the ignition coil as shown.

Positive tester probe → terminal 11

Negative tester probe → → ignition coil base 22



9Measure the primary coil resistance.


☐

Primary coil resistance
0.32–0.48 Ω at 20° C (68° F)

9Connect the pocket tester (Ω 1k) to the ignition coil as shown.

Negative tester probe → terminal 11

Positive tester probe → spark plug lead 22



9Measure the secondary coil resistance.

☐

Secondary coil resistance
5.68–8.52 k Ω at 20° C (68° F)

9Is the ignition coil OK?



YES

NO

Replace the ignition coil.

EAS00748

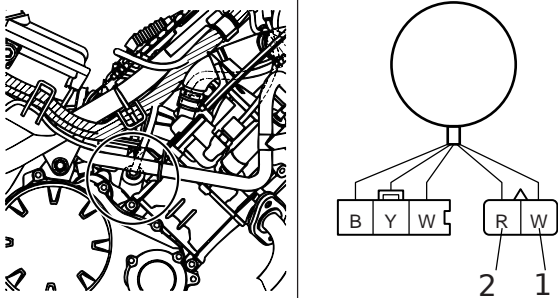
7. Pickup coil resistance

9Disconnect the pickup coil coupler from the wire harness.

9Connect the pocket tester (Ω 100) to the pickup coil terminal as shown.

Positive tester probe → white 11

Negative tester probe → red 22



9Measure the pickup coil resistance.

☐

Pickup coil resistance
248–372 Ω at 20° C (68° F)
(between white and red)

9Is the pickup coil OK?



YES

NO

Replace the stator coil/pickup coil assembly.

EAS00749

8. Main switch

9Check the main switch for continuity.
Refer to “CHECKING THE SWITCHES”.

9Is the main switch OK?



YES

NO

Replace the main switch.

EAS00754

9. Wiring

9Check the entire ignition system wiring.

Refer to "CIRCUITDIAGRAM".

9Is the ignition system wiring properly connected and without defects?



YES

NO

Replace the C.D.I. unit.

Properly connect or repair the ignition system wiring.

1 Main switch
3 Fuse
4 Battery
5 Starter motor
6 Starter relay
7 Right handlebar switch
8 Start switch

EAS00757

TROUBLESHOOTING

The starter motor fails to turn.

Check:

1. fuse
2. battery
3. starter motor
4. starter relay
5. main switch
6. start switch
7. wiring connections
(of the entire starting system)

NOTE:

Before troubleshooting, remove the following part(s):

1. side cowlings (left and right)
2. front cowlings
3. center panels (upper and lower)
4. rear cowlings (left and right)
5. inner panel

Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

EAS00738

1. Fuse

Check the fuse for continuity.
Refer to "CHECKING THE FUSE" in chapter 3.
Is the fuse OK?



YES

NO

Replace the fuse.

EAS00739

2. Battery

Check the condition of the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage
12.8 V or more at 20 ° C

Is the battery OK?



YES

NO

Clean the battery terminals.
Recharge or replace the battery.

EAS00758

3. Starter motor

Connect the positive battery terminal 1 and starter motor lead 2 with a jumper lead 3.

W

A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, otherwise the jumper lead may burn.
This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.

Does the starter motor turn?



YES



NO

Repair or replace the starter motor.

EAS00761

4. Starter relay

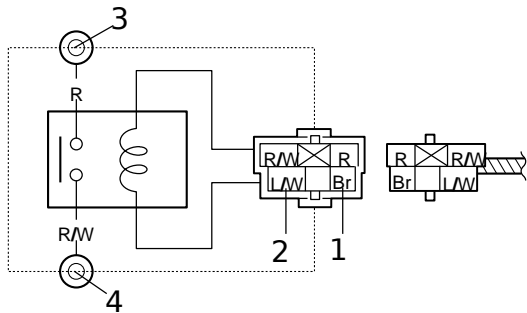
- 9 Remove the starter relay from the starter relay coupler on the wire harness.
- 9 Connect the pocket tester (Ω 1) and battery (DC 12 V) to the starter relay coupler as shown.

Positive battery terminal → brown 11

Negative battery terminal → blue/white 22

Positive tester probe → red 33

Negative tester probe → red/white 44



- 9 Does the starter relay have continuity between red and red/white?

↓ YES

↓ NO

Replace the starter relay.

EAS00749

5. Main switch

- 9 Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- 9 Is the main switch OK?

↓ YES

NO

Replace the main switch.

EAS00764

6. Start switch

- 9 Check the start switch for continuity. Refer to "CHECKING THE SWITCHES".
- 9 Is the start switch OK?

↓ YES

NO

Replace the right handlebar switch.

EAS00766

7. Wiring

- 9 Check the entire starting system wiring. Refer to "CIRCUITDIAGRAM".
- 9 Is the starting system wiring properly connected and without defects?

↓ YES

NO

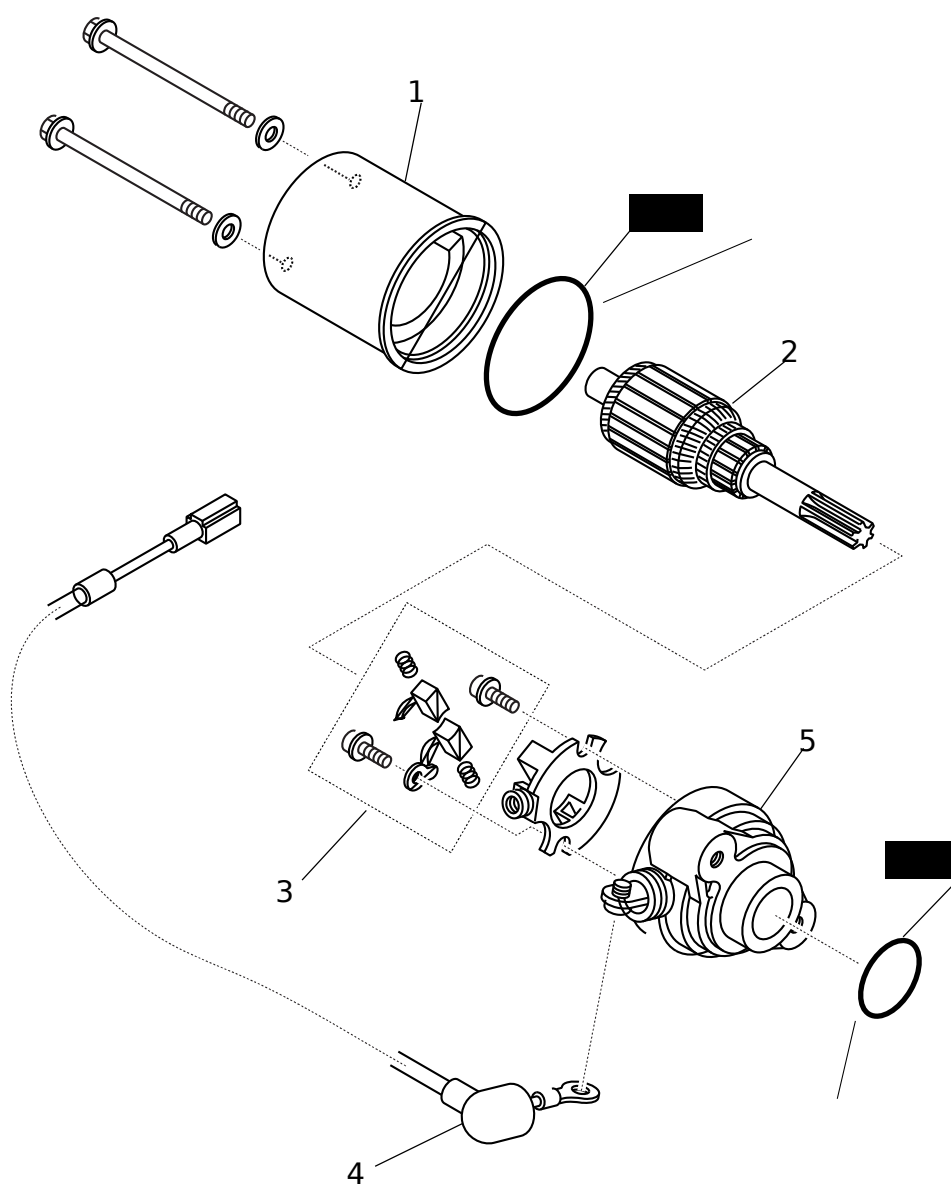
The starting system circuit is OK.

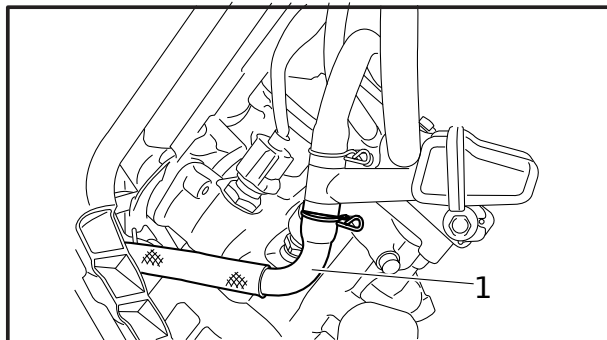
Properly connect or repair the starting system wiring.

EASF0061

STARTER MOTOR (T135SE)

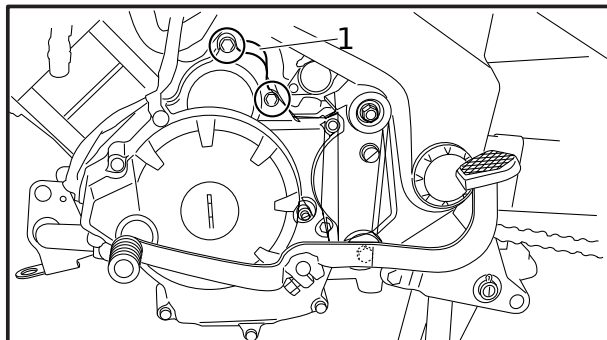
- 1 Starter motor yoke
- 2 Armature
- 3 Brush set
- 4 Starter motor lead
- 5 Starter motor front cover



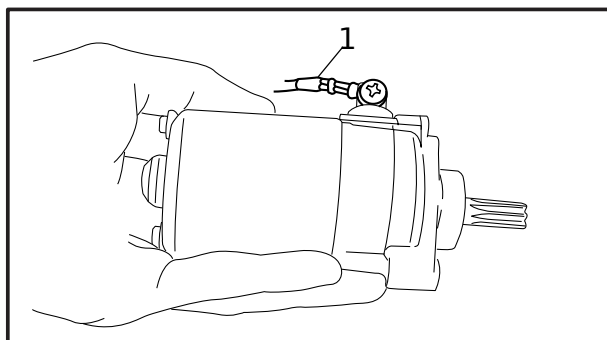


REMOVING THE STARTER MOTOR

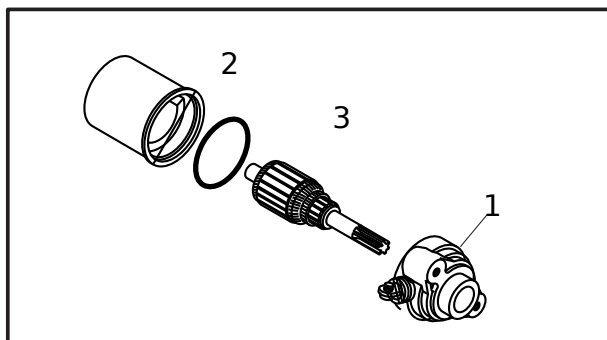
1. Remove:
9breather pipe 1



2. Remove:
9starter motor 1

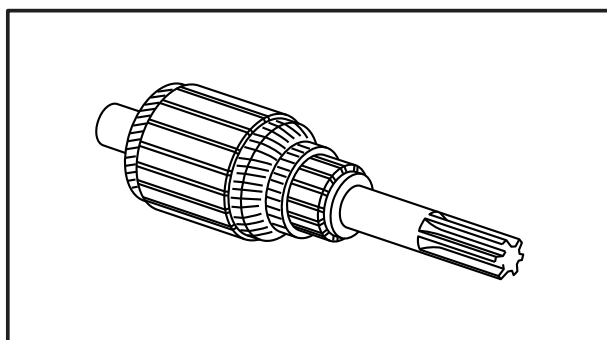


3. Remove:
9starter motor lead 1



DISASSEMBLING THE STARTER MOTOR

1. Remove:
9starter motor front cover bolts
(with washers)
9starter motor front cover 1
9O-ring 2
9armature 3



EAS00769

CHECKING THE STARTER MOTOR

1. Check:
9commutator
Dirt → Clean with 600-grit sandpaper.

STARTER MOTOR (T135SE)

ELEC

—

2. Measure:

9commutator diameter a

Out of specification → Replace the starter motor.

Commutator wear limit
16.6 mm (0.65 in)

3. Measure:

9mica undercut a

Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut
1.35 mm (0.05 in)

NOTE:

The mica of the commutator must be undercut to ensure proper operation of the commutator.

4. Measure:

9armature assembly resistances (commutator and insulation)

Out of specification → Replace the starter motor.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

a. Measure the armature assembly resistances with the pocket tester.

Pocket tester
90890-03112

Armature coil
Commutator resistance ¹¹
0.0315–0.0385 Ω at 20° C (68° F)
Insulation resistance ²²
Above 1 MΩ at 20° C (68° F)

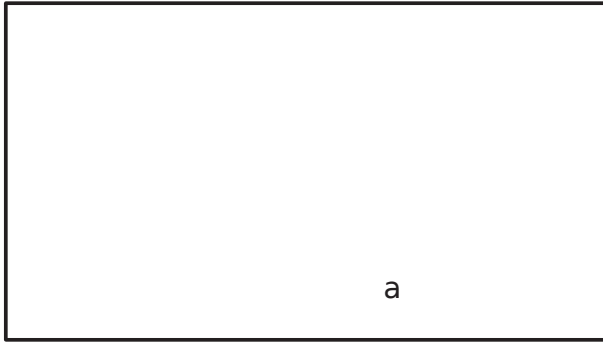
b. If any resistance is out of specification, replace the starter motor.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

STARTER MOTOR (T135SE)

ELEC

-

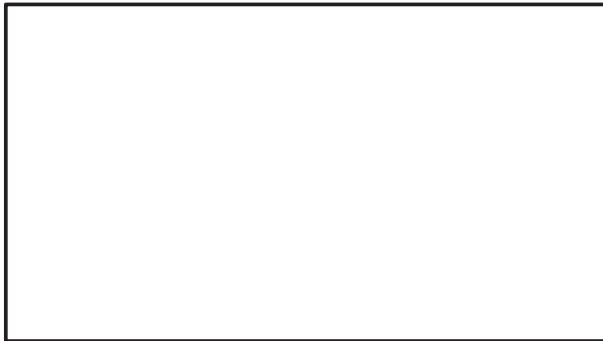


5. Measure:

9brush length a

Out of specification → Replace the brushes as a set.

Brush length wear limit
3.5 mm (0.14 in)



6. Measure:

9brush spring force

Out of specification → Replace the brush springs as a set.

Brush spring force
3.92–5.88 N (400–600 gf)

7. Check:

9gear teeth

Damage/wear → Replace the armature.



EAS00772

ASSEMBLING THE STARTER MOTOR

1. Install:

9O-ring

9armature

(in start motor front cover 1)

9O-ring

9starter motor yoke

9starter motor front cover bolts
(with washers)

9O-ring

NOTE:

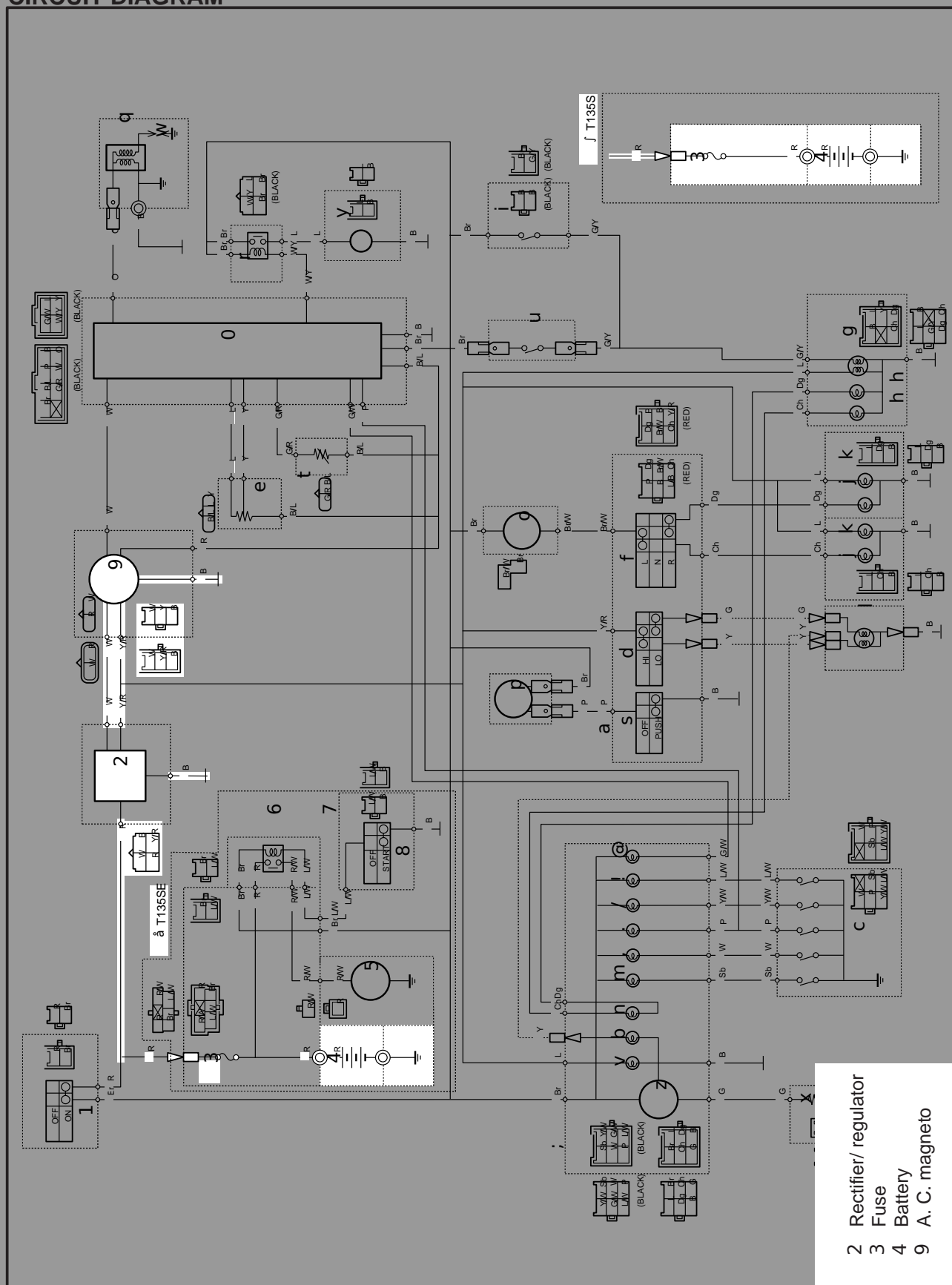
Align the mark a on the starter motor yoke with the mark b on the starter motor front cover.

INSTALLING THE STARTER MOTOR

For installation, reverse the removal procedure.

EAS00773

CIRCUIT DIAGRAM



EAS00774

TROUBLESHOOTING

The battery cannot be charged.

Check:

- 1. fuse
- 2. battery
- 3. charging voltage
- 4. charging coil resistance
- 5. wiring connections
(of the entire charging system)

NOTE:

Before troubleshooting, remove the following part(s):

- 1. side cowlings (left and right)
- 2. front cowling
- 3. center panels (upper and lower)
- 4. rear cowlings (left and right)
- 5. inner panel

Troubleshoot with the following special tool(s).

	Engine tachometer 90890-03113
	Pocket tester 90890-03112


EAS00738

1. Fuse
Check the fuse for continuity. Refer to "CHECKING THE FUSE" in chapter 3.
Is the fuse OK?

YES NO

Replace the fuse.

EAS00739

2. Battery	
Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.	
	Minimum open-circuit voltage 12.8 V or more at 20 ° C
Is the battery OK?	

YES NO

Clean the battery terminals.
Recharge or replace the battery.

EAS00775

3. Charging voltage

9Connect the engine tachometer to the spark plug lead.

9Connect the pocket tester (DC 20 V) to the battery as shown.

Positive tester probe →→→

positive battery terminal 11

Negative tester probe →→→

negative battery terminal 22

9Start the engine and let it run at approximately 5,000 r/min.

9Measure the charging voltage.



Charging voltage
14 V at 5,000 r/min

NOTE:

Make sure the battery is fully charged.

9Is the charging voltage within specification?



NO



YES

The charging circuit
is OK.

EAS00776

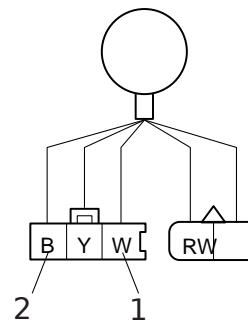
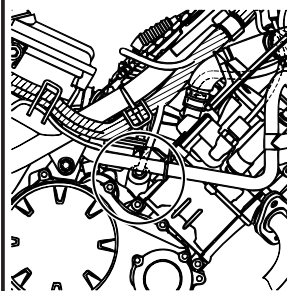
4. Charging coil resistance

9Disconnect the stator coil coupler from the wire harness.

9Connect the pocket tester (Ω 1) to the charging coil terminals as shown.

Positive tester probe → **white 11**

Negative tester probe → **black 22**



9Measure the charging coil resistances.



Charging coil resistance
0.38–0.58 Ω at 20° C (68° F) (W – B)

9Is the charging coil OK?



YES

NO

Replace the stator
coil/pickup coil
assembly.

EAS00779

5. Wiring

9Check the wiring connections of the entire charging system.

Refer to "CIRCUITDIAGRAM".

9Is the charging system wiring properly connected and without defects?



YES

NO

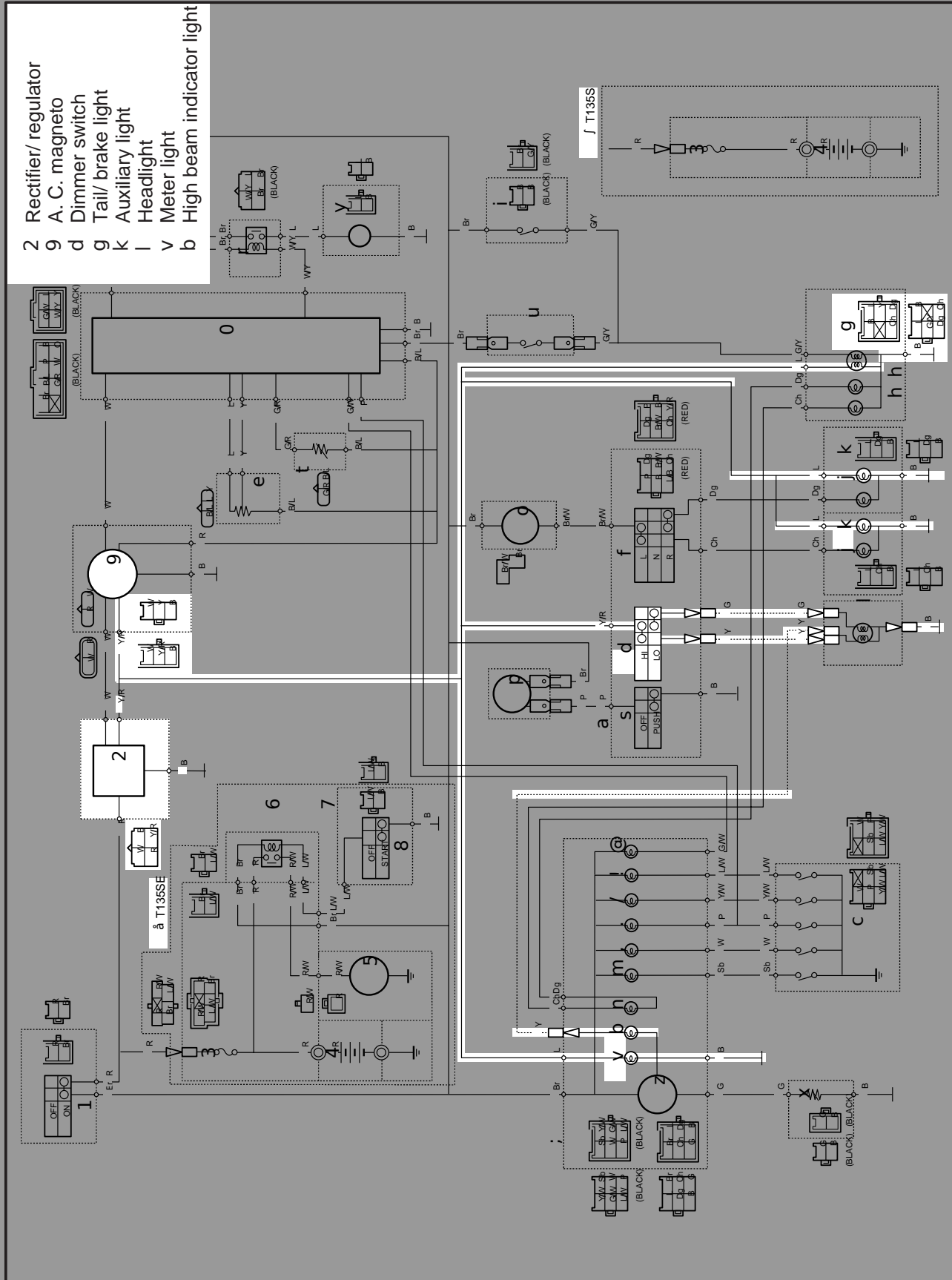
Replace the rectifier/regulator.

Properly connect or
repair the charging
system wiring.

EAS00780

CIRCUIT DIAGRAM

- 2 Rectifier/ regulator
- 9 A. C. magneto
- d Dimmer switch
- g Tail/ brake light
- k Auxiliary light
- l Headlight
- v Meter light
- b High beam indicator light



EAS00781

TROUBLESHOOTING

Any of the following fail to light: head-light, high beam indicator light, taillight, auxiliary light, or meter light.

Check:

1. lighting coil resistance
2. wiring connections
(of the entire lighting system)

NOTE:

Before troubleshooting, remove the following part(s):

1. side cowlings (left and right)
2. front cowling
3. center panels (upper and lower)
4. rear cowling (right)
5. inner panel
6. headlight assembly

Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

EAS00776

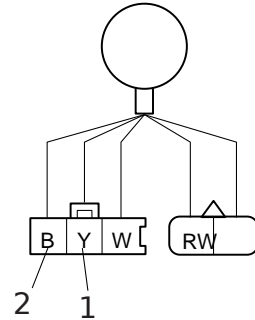
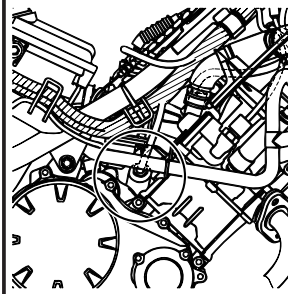
1. Lighting coil resistance

Disconnect the stator coil coupler from the wire harness.

Connect the pocket tester (Ω 1) to the lighting coil terminals as shown.

Positive tester probe → **yellow 11**

Negative tester probe → **black 22**



Measure the lighting coil resistances.



Lighting coil resistance

0.29–0.43 Ω at 20° C (68° F) (Y– B)

Is the lighting coil OK?



YES

NO

Replace the stator coil/pickup coil assembly.

EAS00787

2. Wiring

Check the entire lighting system wiring. Refer to "CIRCUITDIAGRAM".

Is the lighting system wiring properly connected and without defects?



YES

NO

Check the condition of each of the lighting system circuits. Refer to "CHECKING THE LIGHTING SYSTEM".

Properly connect or repair the lighting system wiring.

EAS00788

CHECKING THE LIGHTING SYSTEM

1. The headlight and the high beam indicator light fail to come on.

EAS00784

1. Dimmer switch

- 9Check the dimmer switch for continuity.
Refer to "CHECKING THE SWITCHES".
9Is the dimmer switch OK?



YES

NO

The dimmer switch is faulty. Replace the left handlebar switch.

2. Headlight bulb and socket

- 9Check the headlight bulb and socket for continuity.
Refer to "CHECKING THE BULBS AND BULB SOCKETS".
9Are the headlight bulb and socket OK?



YES

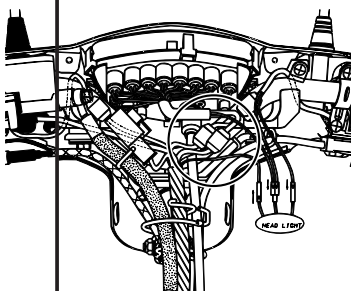
NO

Replace the headlight bulb, socket or both.

3. Voltage

- 9Connect the pocket tester (AC 20 V) to the headlight and high beam indicator light connectors as shown.

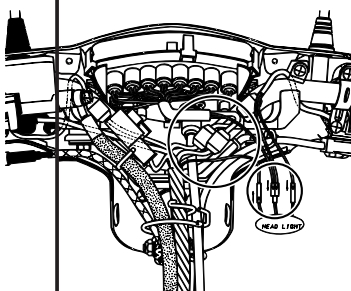
- â When the dimmer switch is set to " % ".
∫ When the dimmer switch is set to " & ".

**Headlight**

Positive tester probe →→

green 11 or yellow 22

Negative tester probe → black 33

**High beam indicator light**

Positive tester probe → yellow 44

Negative tester probe → black 55

- 9Set the main switch to "ON".
9Start the engine.
9Set the dimmer switch to " % " or " & ".
9Measure the voltage (AC 12 V) of green 1 (yellow 2) on the headlight connector (wire harness side) and yellow 4 on the meter assembly connector (wire harness side).
9Is the voltage within specification?



YES

NO

This circuit is OK.

Replace the rectifier/regulator.

EAS00789

EAS00790

2. The meter light fails to come on.

1. Meter light bulb and socket

9Check the meter light bulb and socket for continuity.
Refer to "CHECKING THE BULBS AND BULB SOCKETS".

9Are the meter light bulb and socket OK?



YES

NO

Replace the meter light bulb, socket or both.

3. The tail/brake light fails to come on.

1. Tail/brake light bulb and socket

9Check the tail/brake light bulb and socket for continuity.
Refer to "CHECKING THE BULBS AND BULB SOCKETS".

9Are the tail/brake light bulb and socket OK?



YES

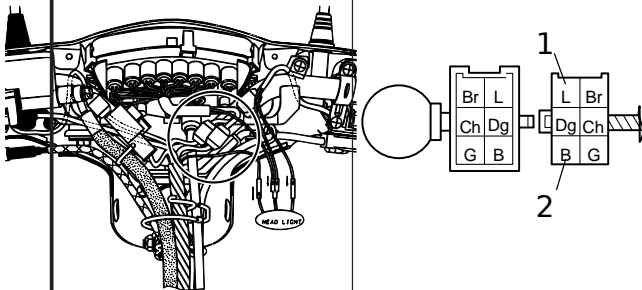
NO

Replace the tail/brake light bulb, socket or both.

2. Voltage

9Connect the pocket tester (AC 20 V) to the meter light coupler (wire harness side) as shown.

Positive tester probe → **blue 11**
Negative tester probe → **black 22**



9Set the main switch to "ON".
9Start the engine.
9Measure the voltage (AC 12 V) of blue lead terminal 1 on the meter light coupler (wire harness side).
9Is the voltage within specification?



YES

NO

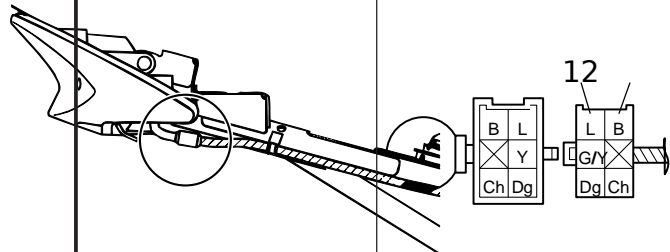
This circuit is OK.

Replace the rectifier/regulator.

2. Voltage

9Connect the pocket tester (AC 20 V) to the tail/brake light coupler (wire harness side) as shown.

Positive tester probe → **blue 11**
Negative tester probe → **black 22**



9Set the main switch to "ON".
9Start the engine.
9Measure the voltage (AC 12 V) of blue lead terminal 1 on the tail/brake light coupler (wire harness side).
9Is the voltage within specification?



YES

NO

This circuit is OK.

Replace the rectifier/regulator.

4. The auxiliary light fails to come on.

1. Meter light bulb and socket

9Check the meter light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

9Are the meter light bulb and socket OK?



YES

NO

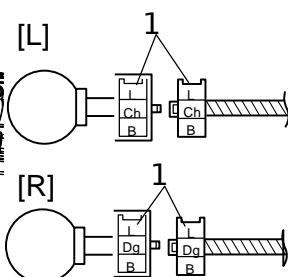
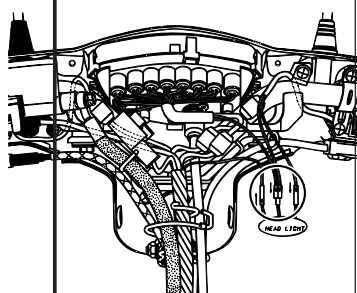
Replace the auxiliary light bulb, socket or both.

2. Voltage

9Connect the pocket tester (AC 20 V) to the auxiliary light coupler (wire harness side) as shown.

Positive tester probe → blue 11

Negative tester probe → black 22



9Set the main switch to "ON".

9Start the engine.

9Measure the voltage (AC 12 V) of blue lead terminal 1 on the auxiliary light coupler (wire harness side).

9Is the voltage within specification?



YES

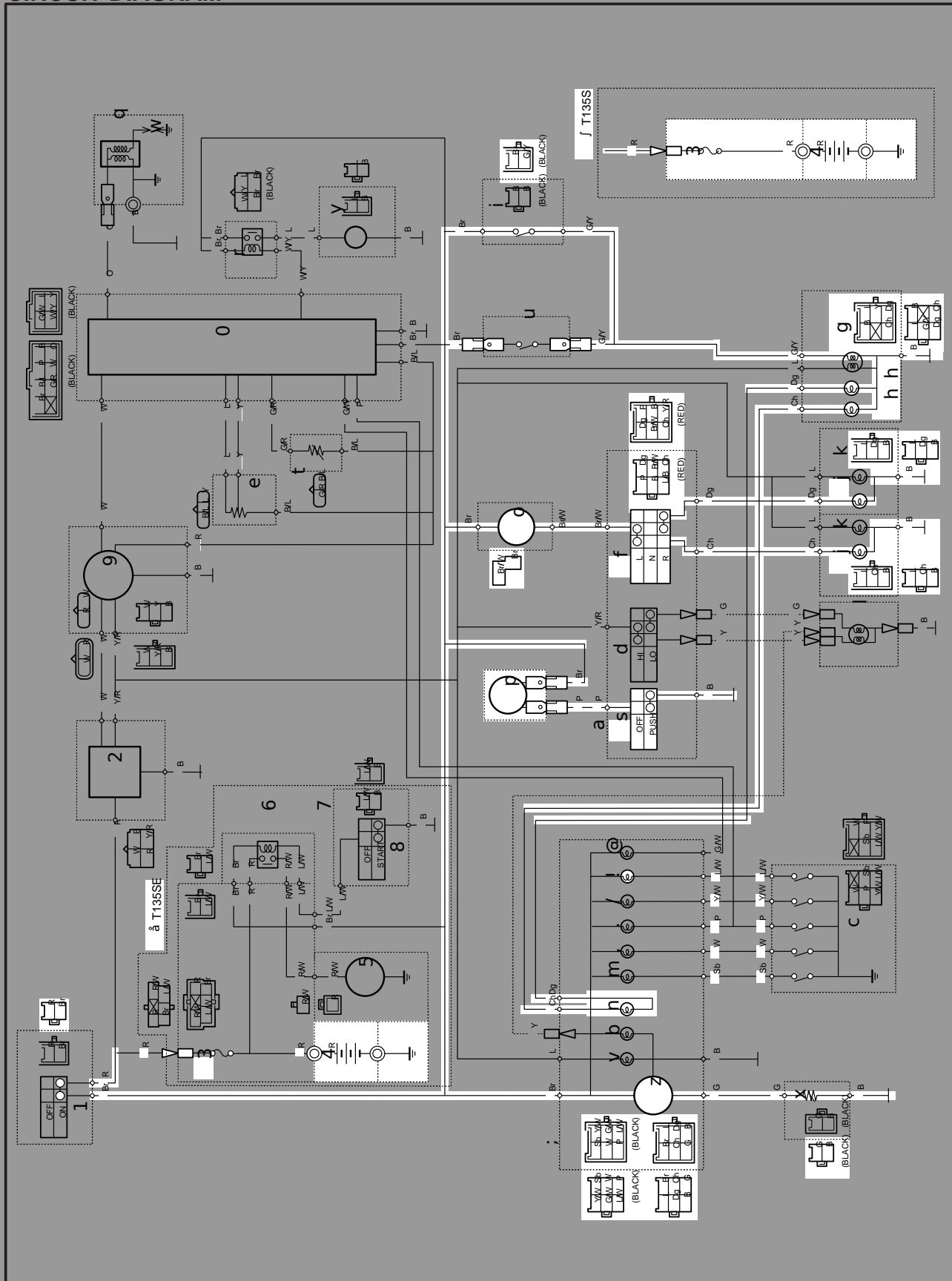
NO

This circuit is OK.

Replace the rectifier/regulator.

EAS00793

CIRCUIT DIAGRAM



- 1 Main switch
- 3 Fuse
- 4 Battery
- u Front brake light switch
- i Rear brake light switch
- o Turn signal relay
- p Horn
- s Horn switch
- f Turn signal switch
- g Tail/brake light
- h Rear turn signal light
- j Front turn signal light
- z Fuel gauge
- x Fuel sender
- c Neutral switch
- n Turn signal indicator light
- m Neutral indicator light
- , 1st gear position indicator light
- . 2nd gear position indicator light
- / 3rd gear position indicator light
- ! 4th gear position indicator light

EAS00794

TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
The horn fails to sound.

Check:

1. fuse
2. battery
3. main switch
4. wiring connections
(of the entire signaling system)

NOTE:

Before troubleshooting, remove the following part(s):

1. side cowling (right)
2. front cowling
3. center panel (lower)
4. rear cowling (right)
5. headlight assembly

Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

EAS00738

1. Fuse

- Check the fuse for continuity.
Refer to "CHECKING THE FUSE" in chapter 3.
Is the fuse OK?



YES

NO

Replace the fuse.

EAS00739

2. Battery

- Check the condition of the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.

Minimum open-circuit voltage
12.8 V or more at 20 ° C (68 ° F)

Is the battery OK?



YES

NO

- Clean the battery terminals.
Recharge or replace the battery.

EAS00783

3. Main switch

- Check the main switch for continuity.
Refer to "CHECKING THE SWITCHES".
Is the main switch OK?



YES

NO

Replace the main switch.

EAS00795

4. Wiring

- Check the entire signaling system wiring.
Refer to "CIRCUITDIAGRAM".
Is the signaling system wiring properly connected and without defects?



YES

NO

Check the condition of each of the signaling system circuits.
Refer to "CHECKING THE SIGNALING SYSTEM".

Properly connect or repair the signaling system wiring.

EAS00796

CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

1. Horn switch

9Check the horn switch for continuity.
Refer to "CHECKING THE SWITCHES".
9Is the horn switch OK?



YES

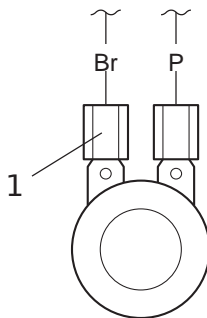
NO

Replace the left handlebar switch.

2. Voltage

9Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

Positive tester probe → brown 11
Negative tester probe → ground



9Set the main switch to "ON".
9Measure the voltage (DC 12 V) of brown lead terminal at the horn terminal.
9Is the voltage within specification?



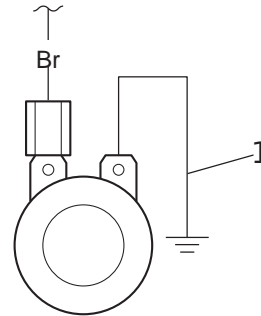
YES

NO

The wiring circuit from the main switch to the horn connector is faulty and must be repaired.

3. Horn

9Disconnect the pink connector at the horn terminal.
9Connect a jumper lead 1 to the horn terminal and ground the jumper lead.
9Set the main switch to "ON".
9Does the horn sound?



NO



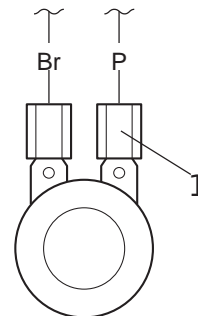
YES

The horn is OK.

4. Voltage

9Connect the pocket tester (DC 20 V) to the horn connector at the pink terminal as shown.

Positive tester probe → pink 11
Negative tester probe → ground



9Set the main switch to "ON".
9Measure the voltage (DC 12 V) of pink lead terminal 1 at the horn terminal.
9Is the voltage within specification?



YES

NO

Repair or replace the horn.

Replace the horn.

EAS00797

2. The tail/brake light fails to come on.

1. Tail/brake light bulb and socket

9Check the tail/brake light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

9Are the tail/brake light bulb and socket OK?



YES

NO

Replace the tail/
brake light bulb,
socket or both.

2. Brake light switches

9Check the brake light switches for continuity.

Refer to "CHECKING THE SWITCHES".

9Is the brake light switch OK?



YES

NO

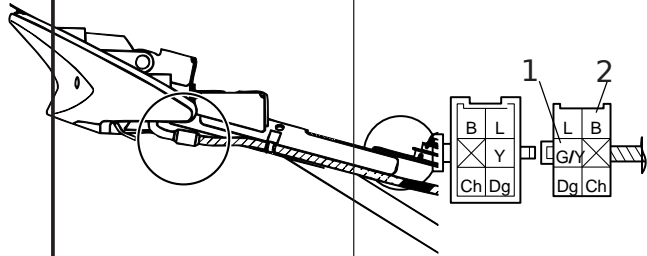
Replace the brake
light switch.

3. Voltage

9Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

Positive tester probe → **green/yellow** 11

Negative tester probe → **black** 22



9Set the main switch to "ON".

9Pull in the brake lever or push down on the brake pedal.

9Measure the voltage (DC 12 V) of green/yellow lead terminal 1 on the tail/brake light coupler (wire harness side).

9Is the voltage within specification?



YES

NO

This circuit is OK.

The wiring circuit
from the main
switch to the
tail/brake light cou-
pler is faulty and
must be repaired.

EAS00799

3. The turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal indicator light bulb and socket

9Check the turn signal light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

9Are the turn signal light bulb and socket OK?



YES

NO

Replace the turn signal light bulb, socket or both.

2. Turn signal switch

9Check the turn signal switch for continuity.

Refer to "CHECKING THE SWITCHES".

9Is the turn signal switch OK?



YES

NO

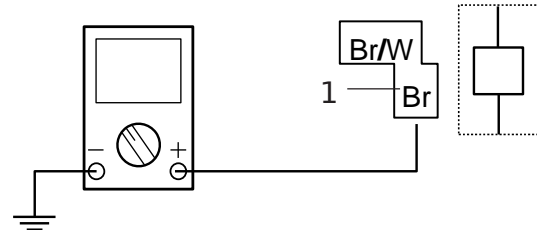
Replace the left handlebar switch.

3. Voltage

9Connect the pocket tester (DC 20 V) to the turn signal relay coupler as shown.

Positive tester probe → **brown 11**

Negative tester probe → **ground**



9Set the main switch to "ON".

9Measure the voltage (DC 12 V) on brown lead terminal 1 at the turn signal relay coupler.

9Is the voltage within specification?



YES

NO

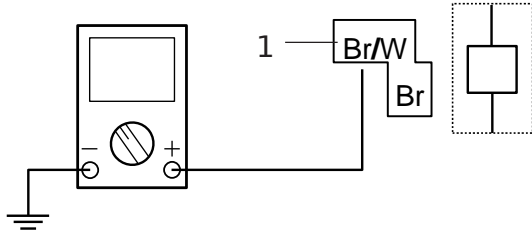
The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.

4. Voltage

9Connect the pocket tester (DC 20 V) to the turn signal relay coupler as shown.

Positive tester probe → brown/white 11

Negative tester probe → ground



9Set the main switch to "ON".

9Measure the voltage (DC 12 V) on brown/white lead terminal 1 at the turn signal relay coupler.

9Is the voltage within specification?

↓ YES

NO

The turn signal relay is faulty and must be replaced.

5. Voltage

9Connect the pocket tester (DC 20 V) to the turn signal light coupler (wire harness side) as shown.

Turn signal light

⚙ Rear

⚙ Front

Left turn signal light

Positive tester probe → chocolate 11

Negative tester probe → ground

Right turn signal light

Positive tester probe → dark green 22

Negative tester probe → ground

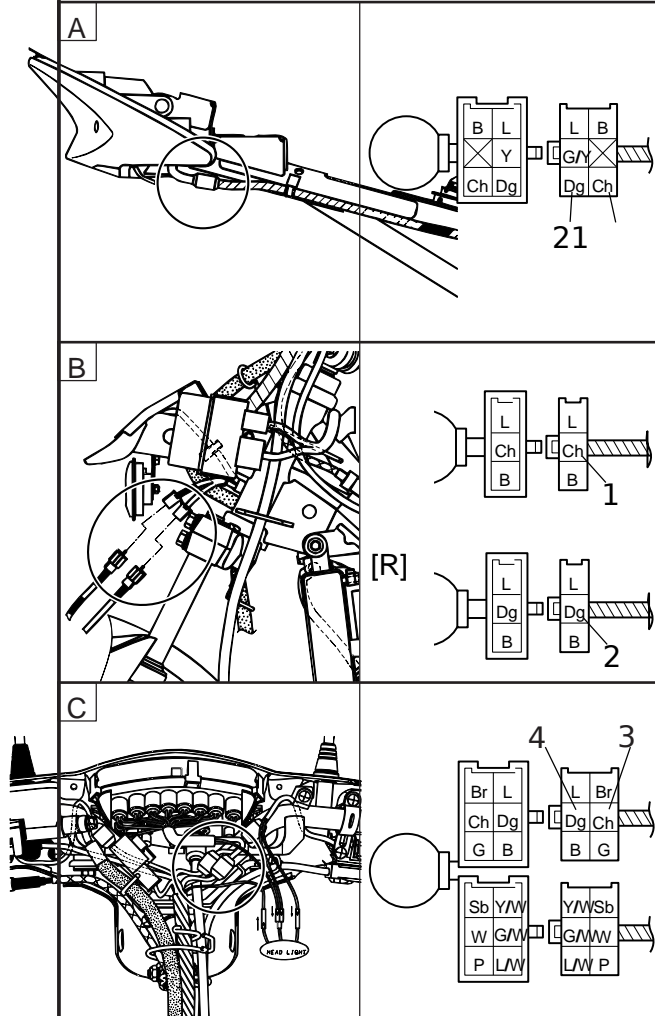
⚙ Turn signal indicator light

Positive tester probe → chocolate 33

Negative tester probe → ground

Positive tester probe → dark green 44

Negative tester probe → ground



9Set the main switch to "ON".
 9Set the turn signal switch to "4 " or "6 ".
 9Measure the voltage (DC 12 V) of the chocolate 1 or dark green lead terminal 2 at the turn signal light coupler (wire harness side) and chocolate 3 or dark green 4 at the turn signal indicator light coupler (wire harness side).
 9Is the voltage within specification?



YES

This circuit is OK.

NO

The wiring circuit from the turn signal switch to the turn signal light coupler is faulty and must be repaired.

EAS00801

4. The gear position indicator lights fail to come on.

1. Gear position indicator light bulb and socket

9Check the gear position indicator light bulb and socket for continuity.
 Refer to "CHECKING THE BULBS AND BULB SOCKETS".

9Are the gear position indicator light bulb and socket OK?



YES

NO

Replace the gear position indicator light bulb, socket or both.

2. Neutral switch

9Check the neutral switch for continuity.
 Refer to "CHECKING THE SWITCHES".

9Is the neutral switch OK?



YES

NO

Replace the neutral switch.

3. Voltage

9Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Neutral indicator light

Positive tester probe → sky blue 11

Negative tester probe → ground

1st gear position indicator light

Positive tester probe → white 22

Negative tester probe → ground

2nd gear position indicator light

Positive tester probe → pink 33

Negative tester probe → ground

3rd gear position indicator light

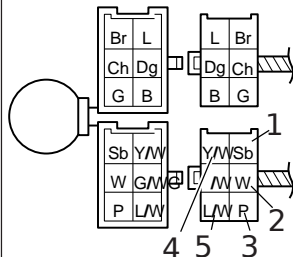
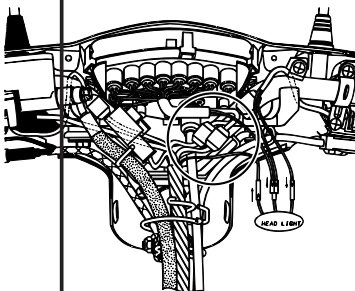
Positive tester probe → yellow/white 44

Negative tester probe → ground

4th gear position indicator light

Positive tester probe → blue/white 55

Negative tester probe → ground



9Set the main switch to "ON".

9Shift the transmission into each gear.

9Measure the voltage (DC 12 V) of the sky blue 1 , white 2 , pink 3 , yellow/white 4 , or blue/white 5 lead terminal at the meter assembly coupler (wire harness side).

9Is the voltage within specification?



YES

NO

This circuit is OK.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

EAS00804

5. The fuel level gauge fails to operate.

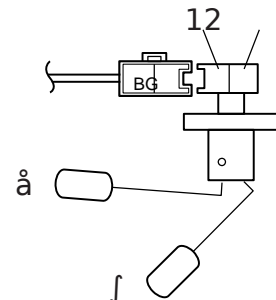
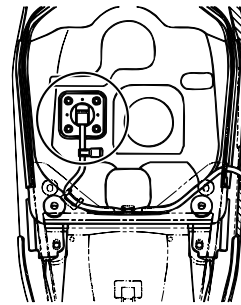
1. Fuel sender

9Remove the fuel sender from the fuel tank.

9Connect the pocket tester to the fuel sender coupler (fuel sender side) as shown.

Positive tester probe → green 11

Negative tester probe → black 22



9Measure the fuel sender resistances.



Fuel sender resistance (up position ♂♂)

($\Omega \cdot 1$)

4–10 Ω at 20° C (68° F)

Fuel sender resistance (down position ♀♀)

($\Omega \cdot 10$)

90–100 Ω at 20° C (68° F)

9Is the fuel sender OK?



YES

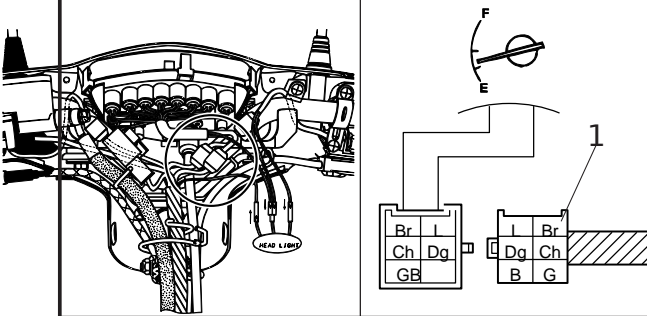
NO

Replace the fuel sender.

2. Voltage

9Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Positive tester probe → brown 11
Negative tester probe → ground



9Set the main switch to "ON".
 9Measure the voltage (DC 12 V) of brown lead terminal 1 on the meter assembly coupler (wire harness side).
 9Is the voltage within specification?



YES

NO

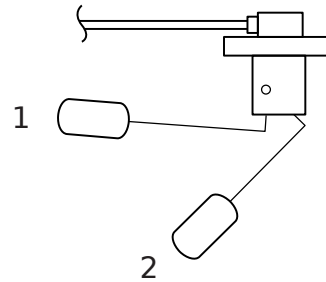
Check the wiring connections of the entire signaling system

3. Fuel level gauge

9Set the main switch to "ON".
 9Move the float up 1 or down 2.
 9Check that the fuel level gauge needle moves to "F" or "E".

NOTE:

Before reading the fuel level gauge, leave the float in one position (either up or down) for at least three minutes.



9Does the fuel level gauge needle move appropriately?



YES

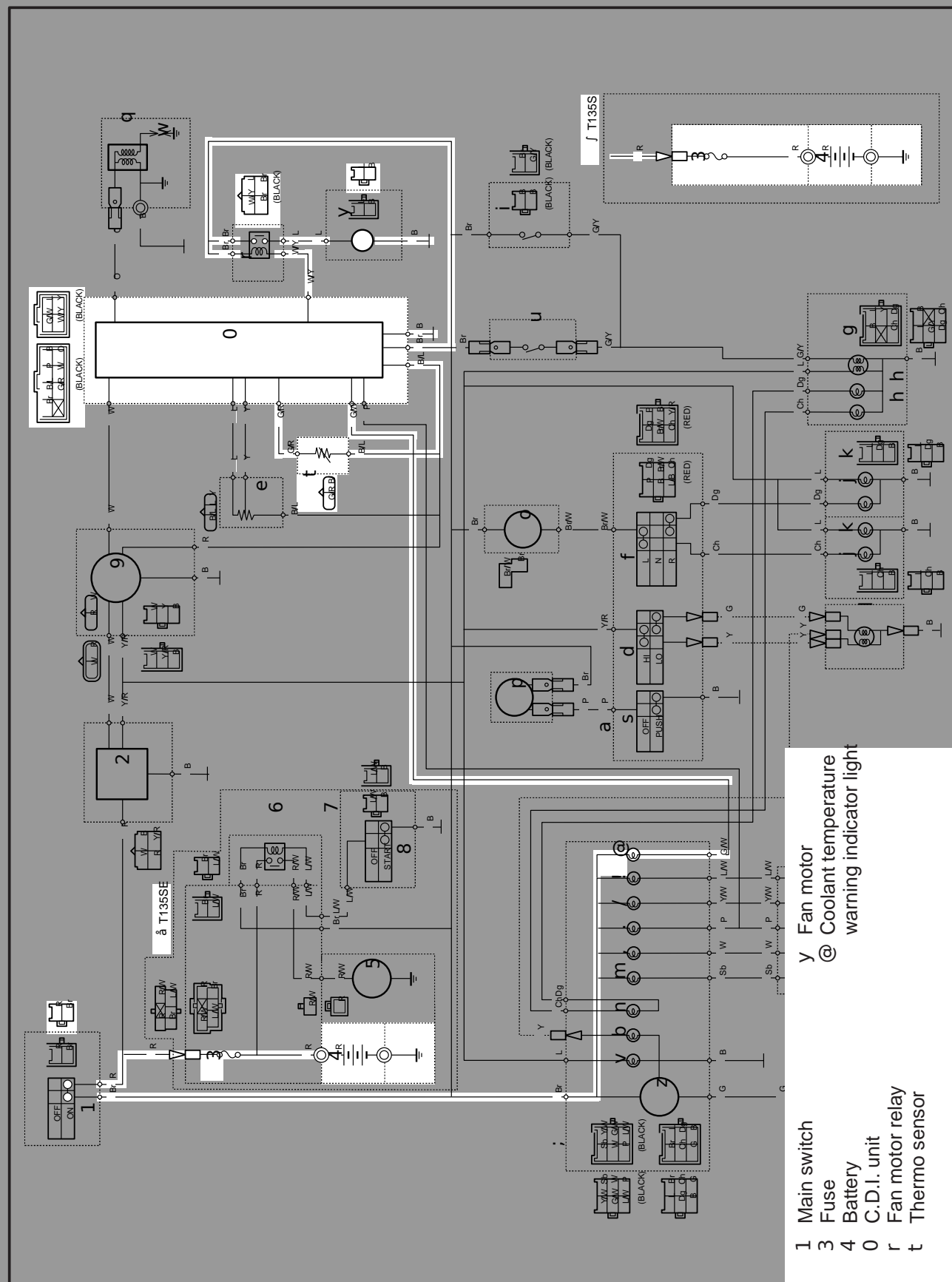
NO

Replace the fuel level gauge.

4. Wiring

Check the entire signaling system's wiring.

COOLING SYSTEM CIRCUIT DIAGRAM



TROUBLESHOOTING

9The radiator fan motor fails to turn.

Check:

1. fuse
2. battery
3. main switch
4. fan motor
5. fan motor relay
6. thermo sensor
7. wiring harness
(of the entire cooling system)

NOTE:

9Before troubleshooting, remove the following part(s):

1. side cowlings (left and right)
2. center panel (lower)
3. rear cowling (right)
4. coolant

9Troubleshoot with the following special service tool(s).

Pocket tester

90890-03112

Digital circuit tester

90890-03174

EAS00738

1. Fuse

9Check the fuse for continuity.
Refer to "CHECKING THE FUSE" in chapter 3.

9Is the fuse OK?



YES

NO

Replace the fuse.

EAS00739

2. Battery

9Check the condition of the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage
12.8 V or more at 20 ° C (68 ° F)

9Is the battery OK?



YES

NO

9Clean the battery terminals.

9Recharge or replace the battery.

EAS00783

3. Main switch

9Check the main switch for continuity.
Refer to "CHECKING THE SWITCHES".

9Is the main switch OK?



YES

NO

Replace the main switch.

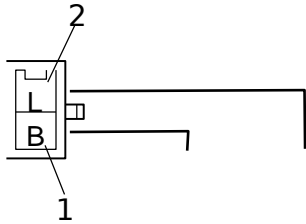
4. Radiator fan motor

9Disconnect the radiator fan motor coupler from the wireharness.

9Connect the battery (12 V) as shown.

Battery positive lead → **blue 11**

Battery negative lead → **black 22**



9Does the radiator fan motor turn?



YES

NO

The radiator fan motor is faulty and must be replaced.

5. Radiator fan motor relay

9Disconnect the radiator fan motor relay coupler.

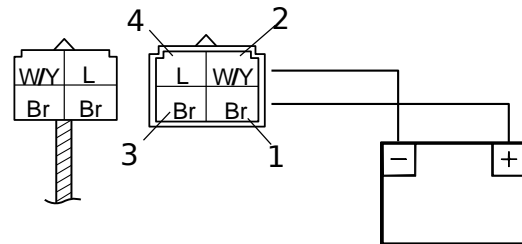
9Connect the pocket tester to the radiator fan motor relay coupler (relay side) as shown.

Battery positive lead → **brown 11**

Battery negative lead → **white/yellow 22**

Positive tester probe → **brown 33**

Negative tester probe → **blue 44**



9Check the radiator fan motor relay blue and brown for continuity.

9Does the coupler is OK?



YES

NO

Replace the radiator fan motor relay.

6. Thermo sensor

- 9 Remove the thermo sensor from the cylinder.
- 9 Connect the digital circuit tester ($\Omega \cdot 100$) to the thermo switch 1 as shown.
- 9 Immerse the thermo sensor in a container filled with coolant 2 .

NOTE:

Make sure that the thermo sensor terminals do not get wet.

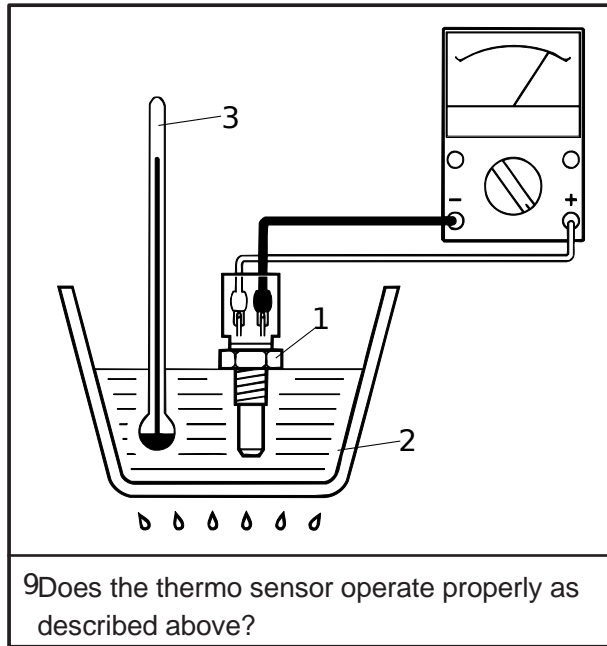
- 9 Place a thermometer 3 in the coolant.
- 9 Slowly heat the coolant, then let it cool to the specified temperature as indicated in the table.
- 9 Check the thermo sensor for continuity at the temperatures indicated in the table.



Thermo sensor resistance
 2.32–2.59 $k\Omega$ at 20° C (68° F)
 310–326 Ω at 80° C (176° F)
 140–144 Ω at 110° C (230° F)

W

- 9 Handle the thermo sensor with special care.
- 9 Never subject the thermo sensor to strong shocks. If the thermo sensor is dropped, replace it.



YES

NO

Tighten the thermo sensor to specified torque.

18 Nm
(1.8 m•kg, 13 ft•lb)

Replace the thermo sensor.

EAS00795

7. Wiring

- 9 Check the entire signaling system wiring. Refer to "CIRCUITDIAGRAM".
- 9 Is the signaling system wiring properly connected and without defects?



YES

NO

Check the condition of each of the cooling system circuits. Refer to "CHECKING THE COOLING SYSTEM".

Properly connect or repair the cooling system wiring.

SELF-DIAGNOSIS

The T135SE/S features a self-diagnosing system for following circuit (-s).

1. Throttle position sensor (TPS)
2. Thermo sensor

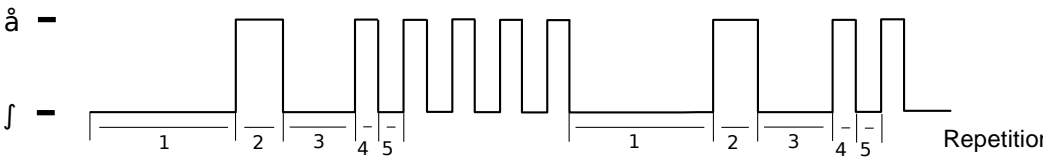
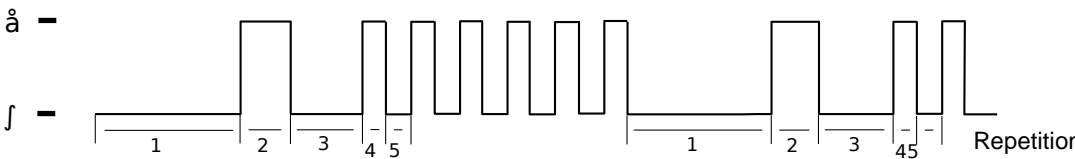
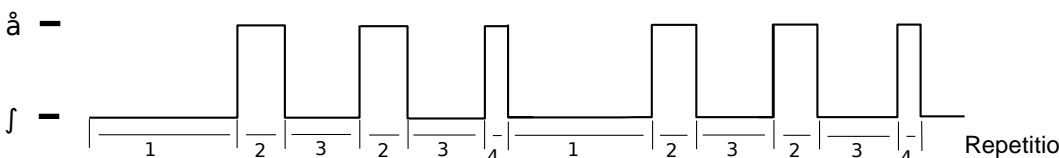
1. ENGINE TROUBLE INDICATOR LIGHT

When the main switch is turned to "ON", the following items are monitored and the condition codes are displayed on the coolant temperature warning indicator light (irrespective of whether the engine is running or not).

Item	Condition	Response	Display condition code
Throttle position sensor (TPS)	Disconnected Short-circuit	⁹ Enables the vehicle to run so that the ignition timing is fixed when the throttle is fully opened.	Blinks in Fault code [1]
	Locked	⁹ Displays the condition code on the coolant temperature warning indicator light.	Blinks in Fault code [2]
Thermo sensor	Disconnected Short-circuit	⁹ Enables the vehicle to run so that the ignition timing is fixed. ⁹ Displays the condition code on the coolant temperature warning indicator light.	Blinks in Fault code [3]

Display order on the coolant temperature warning indicator light

When one item being monitored

Fault code	Condition
[1]	
[2]	
[3]	

- 1 3 seconds

2 1 second

3 1.5 seconds

4 0.5 seconds

5 0.5 seconds
- Light on

Light off

When more than one item is being monitored

1 Light off (seconds) 3 sconds

2 Light on (seconds) 1 scond

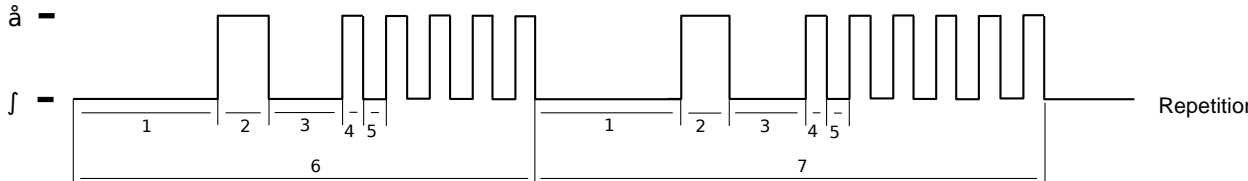
3 Light off (seconds) 1.5 sconds

4 Light on (seconds) 0.5 sconds

5 Light off (seconds) 0.5 sconds

6 1 cycle Fault code [1]

7 1 cycle Fault code [2]



TROUBLESHOOTING

The coolant temperature warning indicator light starts to display the self-diagnosis sequence.

Check:

1. throttle position sensor
2. thermo sensor

NOTE:

Before troubleshooting, remove the following part(s):

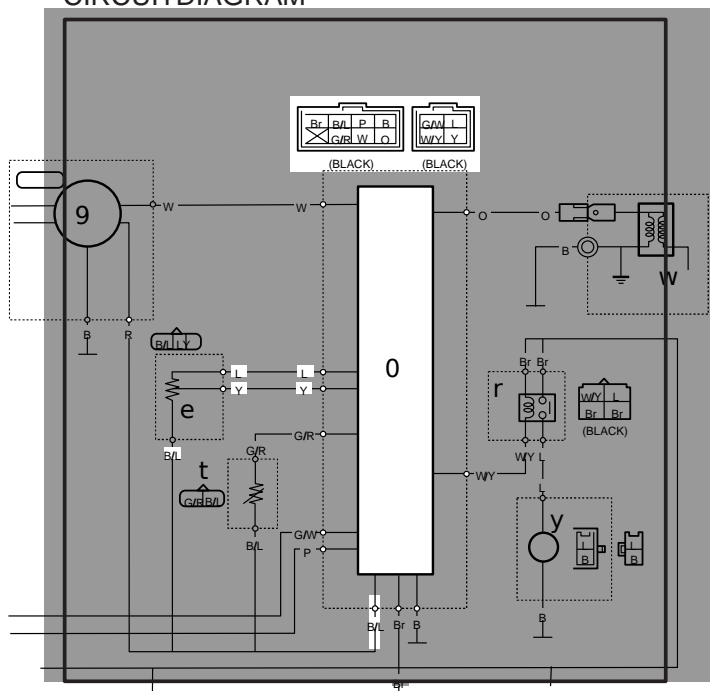
1. side cowlings (left and right)
2. front cowlings
3. center panel (lower)

Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

1. Throttle position sensor

CIRCUITDIAGRAM



0 C.D.I. unit

e Throttle position sensor

1. Wire harness

Check the wire harness for continuity.

Refer to "CIRCUITDIAGRAM".

Is the wire harness OK?



YES

NO

Repair or replace the wire harness.

2. Throttle position sensor

Check the throttle position sensor for continuity.

Refer to "CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR" in chapter 6.

Is the throttle position sensor OK?



YES

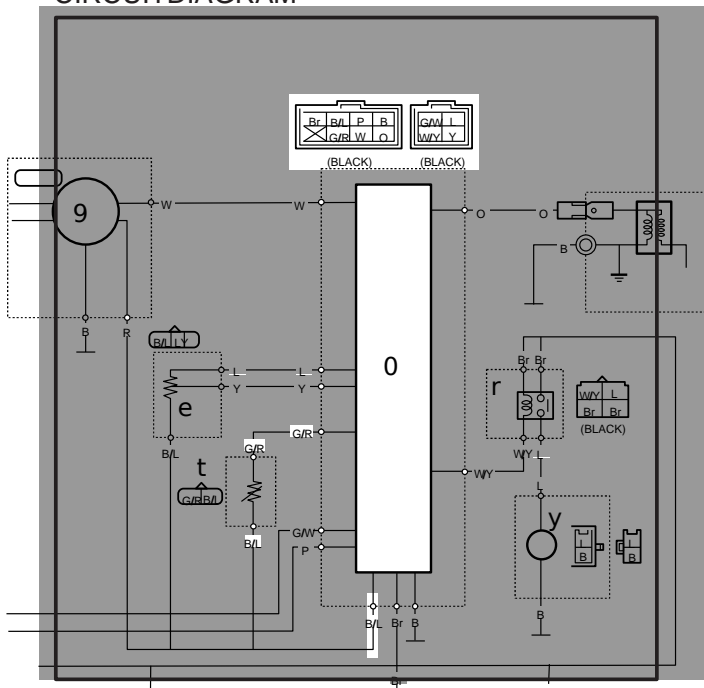
NO

Replace the C.D.I unit.

Replace the throttle position sensor.

2. Thermo sensor

CIRCUITDIAGRAM



0 C.D.I. unit

t Thermo sensor

1. Wireharness

9Check the wireharness for continuity.

Refer to "CIRCUITDIAGRAM".

9Is the wireharness OK?

YES

NO

Repair or replace the wireharness.

2. Thermo sensor

9Check the thermo sensor.

Refer to "COOLING SYSTEM".

9Is the thermo sensor OK?



YES

NO

Replace the C.D.I. unit.

Replace the thermo sensor.



CHAPTER 9 TROUBLESHOOTING

TROUBLESHOOTING	9-1
ELECTRICALSYSTEM	9-1
COMPRESSION SYSTEM	9-2
INTAKE AND EXHAUSTSYSTEM	9-3



TROUBLESHOOTING

TROUBLESHOOTING
ELECTRICAL SYSTEM***CHECK ALL WIRES CONNECTIONS****MAIN SWITCH** (see page 8-5)

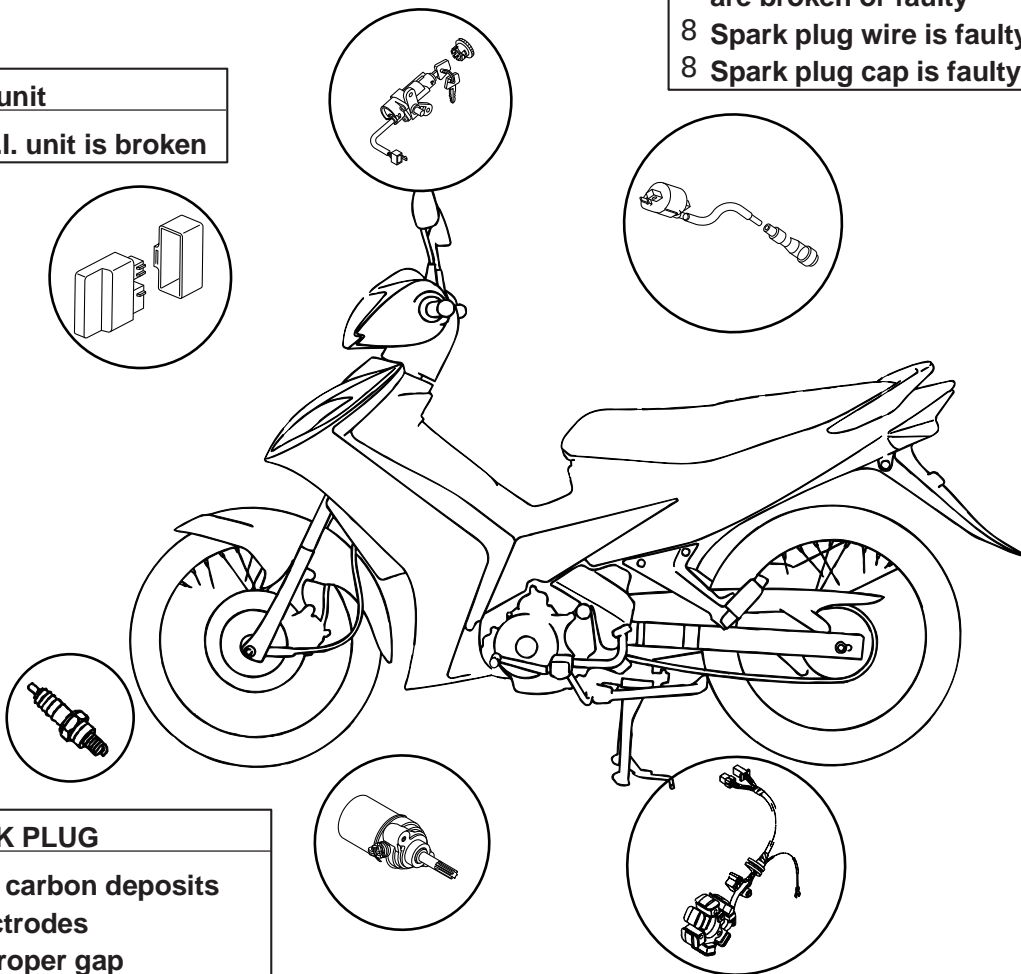
- 8 Main switch is shorted

IGNITION COIL (see page 8-13)

- 8 Primary or secondary windings are broken or faulty
- 8 Spark plug wire is faulty
- 8 Spark plug cap is faulty

C.D.I. unit

- 8 C.D.I. unit is broken

**SPARK PLUG**

- 8 Wet carbon deposits
- 8 Electrodes
- 8 Improper gap
- 8 Broken

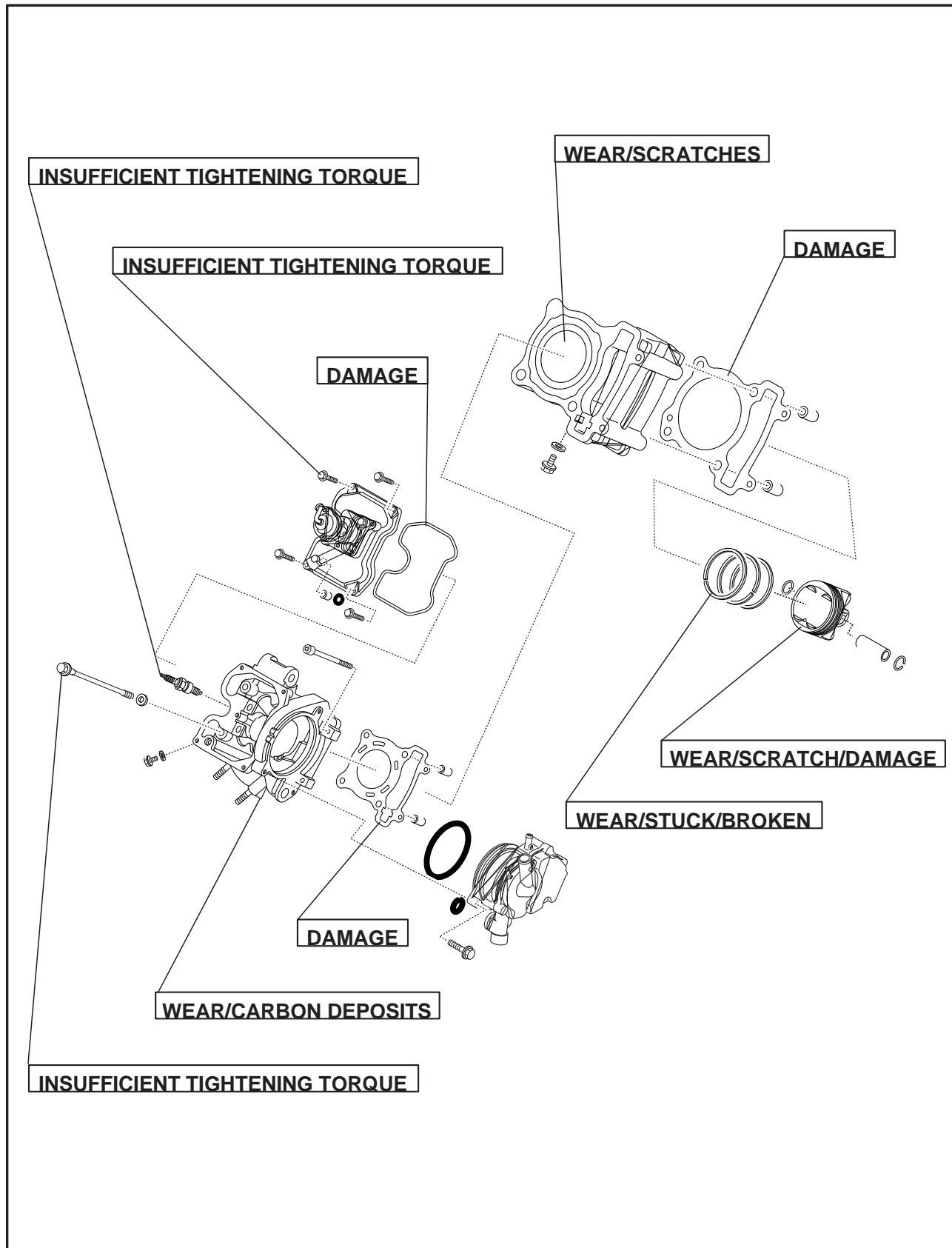
STARTER MOTOR (see page 8-18)

- 8 Starter motor is broken or faulty
- 8 Starter relay is broken
- 8 Starter switch is broken

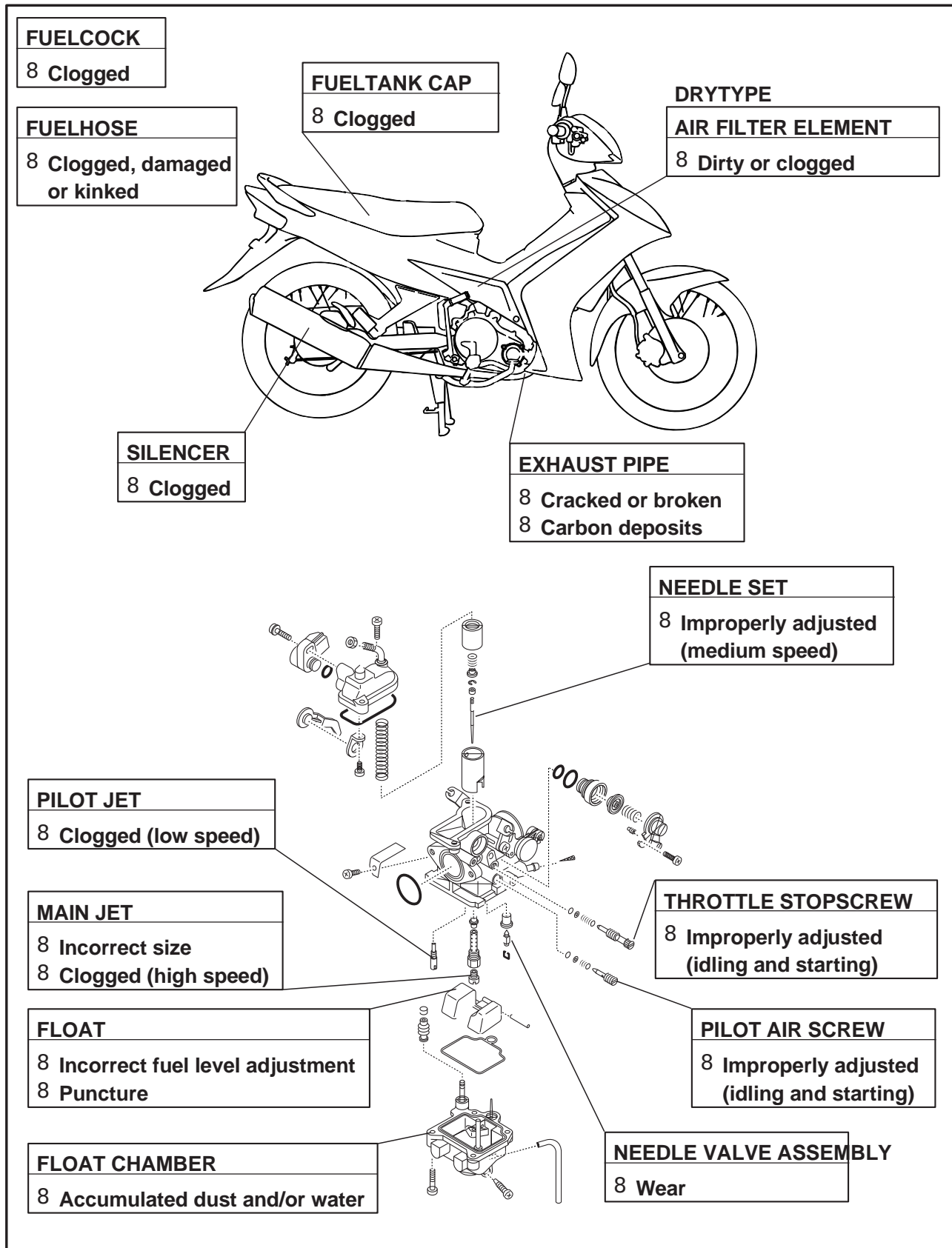
CHARGING COIL (see page 8-24)/
PICKUP COIL (see page 8-13)

- 8 Windings are broken

COMPRESSION SYSTEM



INTAKE AND EXHAUST SYSTEM







YAMAHA MOTOR CO., LTD.
2500 SHINGAI IWATA SHIZUOKA JAPAN

T135SE/ T135S WIRING DIAGRAM

